

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT			1. CONTRACT ID CODE		PAGE OF PAGES 1 17		
2. MODIFICATION NO.: 0002		3. EFFECTIVE DATE SEP 18, 2002		4. REQUISITION/PURCHASE REQ. NO. W81W3G-2035-7181		PROJECT NO. (If applicable)	
6. ISSUED BY Department of the Army Baltimore District, Corps of Engineers Contracting Division P.O. Box 1715 Baltimore MD 21203-1715		CODE CA31		7. ADMINISTERED BY: Contracting Division, Contracts Branch CENAB-CT-C 10 S. Howard ST. Room 7000 Baltimore, MD 21203-1715		CODE E1P0100	
8. NAME AND ADDRESS OF CONTRACTOR (No., street, county, State and ZIP Code)				(x)		9A. AMENDMENT OF SOLICITATION NO. DACW31-02-B-0026	
				X		9B. DATED (SEE ITEM 11) AUG 20, 2002	
						10A. MODIFICATION OF CONTRACT/ ORDER NO.	
						10B. DATED (SEE ITEM 13)	
CODE		FACILITY CODE					

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

	The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers is not extended.
	BID OPENING DATE 1:00 PM, LOCAL TIME, SEP 27, 2002

Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods:

(a) By completing Items 8 and 15, and returning 1 copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA (If required)

**13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS,
IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.**

	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER No. ITEM 10A
	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR43.103(b)
	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF: changes clause FAR 52.243.1
	D. OTHER (Specify type of modification and authority)

E. IMPORTANT: Contractor is not, is required to sign this document and return copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)

**RENOVATION/MODERNIZATION OF THOMSON ELEMENTARY SCHOOL
WASHINGTON, DC**

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect

15A. NAME AND TITLE OF SIGNER (Type or print)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print)	
15B. CONTRACTOR/OFFEROR	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA	16C. DATE SIGNED
(signature of person authorized to sign)		BY (Signature of Contracting Officer)	

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SPECIFICATIONS:

- 1) Table of Contents: Delete Table of Contents and replace with the attached Table of Contents.
- 2) Page 01000-2, Paragraph 1.4.2: Add the following: "Thomson ES version dated 26 July 2002 Section 01000 para. 1.4.2 insert as follows: The program and data must be IBM PC compatible in a Window environment. The Government utilizes Primavera project planner software (P3). The RMS of Section 01312A utilizes Primavera. Contractor interfacing with this software can be done without Primavera by exporting data in the SDEF format. SDEF is Standard Data Exchange Format. Verify if non-Primavera software can export SDEF by using the tools located on this webpage: <http://winrms.usace.army.mil/p3sdef.htm> The Section 01312A -QCS manual contains information about SDEF. It can be downloaded from : <http://winrms.usace.army.mil/contractor's.htm> login is qcrms, password is corps, domain remains blank. SDEF is mandatory by ER 1-1-11, which can be downloaded here: <http://www.usace.army.mil/inet/usace-docs/eng-regs/er1-1-11/toc.htm>"
- 3) Page 01050-11, Paragraph 1.15: Delete paragraph text as originally issued and substitute therefor the following: "In order to complete construction by the specified completion date the contractor is permitted to work as required. This is a commercial district. Therefor, the typical hours of operation of 0700 to 1900 hours Monday through Saturday may be varied."
- 4) Page 01110-2, Paragraph 1.4: Delete the list of drawings "C101.CAL...EFC-9.CAL" and substitute thereof the revised list of drawings "C101.CAL...SP-1.CAL".
- 5) Page 01110-6, Paragraph 1.7.1: Revise last sentence to read "Burning of trash or rubbish is not permitted."
- 6) Page 01200-1, Paragraph 1.1: Delete the second and third sentence of this paragraph.
- 7) Page 01312A-6, Paragraph 1.6.5: Add the following: "The Government utilizes Primavera project planner software (P3). The RMS of Section 01312A utilizes Primavera. Contractor interfacing with this software can be done without Primavera by exporting data in the SDEF format. SDEF is Standard Data Exchange Format. Verify if non-Primavera software can export SDEF by using the tools located on this webpage: <http://winrms.usace.army.mil/p3sdef.htm>. The Section 01312A -QCS manual contains information about SDEF. It can be downloaded from : <http://winrms.usace.army.mil/contractor's.htm>. Login is "qcrms," password is "corps," domain remains blank. SDEF is mandatory by ER 1-1-11, which can be downloaded here: <http://www.usace.army.mil/inet/usace-docs/eng-regs/er1-1-11/toc.htm>."
- 8) Page 01320-4, Paragraph 3.3: Revise the last sentence of the paragraph to read:

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“...approval by the Contracting Officer. The Government utilizes Primavera project planner software (P3). The RMS of Section 01312A utilizes Primavera. Contractor interfacing with this software can be done without Primavera by exporting data in the SDEF format. SDEF is Standard Data Exchange Format. Verify if non-Primavera software can export SDEF by using the tools located on this webpage: <http://winrms.usace.army.mil/p3sdef.htm>. The Section 01312A -QCS manual contains information about SDEF. It can be downloaded from <http://winrms.usace.army.mil/contractor's.htm>. Login is “qcrms,” password is “corps,” domain remains blank. SDEF is mandatory by ER 1-1-11, which can be downloaded here: <http://www.usace.army.mil/inet/usace-docs/eng-regs/er1-1-11/toc.htm>.”

9) Sections 01411, 01450, 01500, 01600, 01750, 09960, 09970, 14215: Delete these sections in their entirety.

10) Section 01420: Delete this section in its entirety and substitute therefor the attached Section 01420 SOURCES FOR REFERENCE PUBLICATIONS, dated 06/02.

11) Page 01510-5, Paragraph 1.8: Add the following: “Fence Posts shall be driven 3 feet into ground, fence shall be topped with 45 degree angled 3 strands of barbed wire, 7 gauge coil spring wire in lieu of top rail, two secure gates per fence, to remain in place till authorized in writing by the contracting officer to be removed.”

12) Page 02635-6, Paragraph 1.5: Immediately after this paragraph, insert the following paragraph:

“1.6 CERTIFICATIONS

Submit Certification signed by Contractor and foundation drainage system Installer certifying that installed materials conform to specified requirements and system was successfully checked and tested prior to covering with drainage fill.”

13) Page 02635-9, Paragraph 2.7: Immediately after this paragraph, insert the following paragraph:

“2.8 FOUNDATION DRAINS

2.8.1 Drainage Piping

Pipe shall be 4" slotted corrugated polyethylene (P.E. tubing) per ASTM F 405, with maximum 1/8" slot width for at least the lower 120 sector. All pipe material shall be from a single manufacturer.

2.8.2 Drainage Fill

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Evenly graded filter stone gradation per AASHTO No. 7 aggregate. Unless referenced otherwise, 100% shall pass a 1/2" sieve and 5% passing a No. 50 sieve.

14) Page 02635-10, Paragraph 3.3.4: Immediately after this paragraph, insert the following paragraph:

“3.3.5 Foundation Drain Installation

Foundation drain piping shall be installed continuously along full length of all new foundation walls. Connect foundation drainage system to Storm Sewer system via the Sump Pump at the Sewage Ejector Room.”

15) Page 02635-11, Paragraph 3.8: Immediately after this paragraph, insert the following paragraphs:

“3.9 FOUNDATION DRAINAGE FILL

Place drainage fill over drain lines after satisfactory testing of drain lines material.

Completely cover drain lines to a width of at least 6" on each side and above top of pipe 12". Place fill material in layers not exceeding 3" in loose depth and compact each layer placed.

3.10 FOUNDATION DRAIN TESTING

Test lines before backfilling to assure free flow. Remove obstructions, replace damaged components and retest system until satisfactory.”

16) Section 02773: Immediately after this section, insert the following attached sections: Section 02791 PLAYGROUND PROTECTIVE SURFACING, Section 02870A SITE FURNISHINGS, and Section 02882 PLAYGROUND EQUIPMENT, all dated 06/01.

17) Page 02920-3, Paragraph 1.4.1: Change the following:

- a. Delete “Seed and Fertilizer”. Replace with “Fertilizer”.
- b. Delete “Grass seed and fertilizer”. Replace with “Fertilizer”.

18) Page 02920-3, Paragraph 1.4.2: Delete this paragraph.

19) Page 02920-4, Paragraph 2.3: Delete this paragraph.

20) Page 02920-5, Paragraph 2.4: Delete this paragraph.

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- 21) Page 02920-5, Paragraph 2.6: Delete “Fertilizer shall be commercial Grade.”, and substitute therefor “Commercial fertilizer shall be used for initial preparation and shall conform to the applicable state fertilizer laws. Organic lawn fertilizer shall be used for surface application after grass is up. Fertilizer shall be uniform in composition, dry and free flowing, and shall be delivered to the site in the original, unopened containers, each bearing the manufacturer's guaranteed analysis. Any fertilizer which becomes caked or otherwise damaged, making it unsuitable for use, will not be acceptable.”
- 22) Page 02920-5, Paragraph 2.7: Delete “salt or bahia hay or threshed straw of wheat, rye, oats, or barley” and substitute therefor “lightweight photodegradable polypropylene with natural straw material”.
- 23) Page 02920-5, Paragraph 3.3.1: Change the following:
- a. Add: “Provide mulch at all landscaped areas including, but not limited to, tree boxes, planters, and all areas adjacent to walks.”
 - b. Delete “seeding” and substitute therefor “planting”.
- 24) Page 03900-4, Paragraph 3.1: Add the following: “At the top of the masonry wall rig a spray bar 18" from the surface. Using only city water pressure, adjust the flow rate to provide a minimal continuous sheet of water. Perform an initial test run of 4 hours, to evaluate adequate cleaning compared with adjacent existing surface. Provide for adequate ground drainage and protection against interior leaks. Use this method before attempting any other cleaning method. Proceed by overlapping the prior cleaned area. Air temperature must exceed 40 and the surface temperature be above freezing. Receive approval from Contracting Officer before proceeding with any other cleaning method.”
- 25) Page 05500A-6, Paragraph 2.2: Delete “70 mile/h” and substitute therefor “90 mile/h”.
- 26) Page 05500A-10, Paragraph 2.15: Change the following:
- a. Delete the title “PARTITIONS, DIAMOND MESH TYPE” and substitute therefor “MESH SCREENING”
 - b. Delete “Partition panels...of the panel” and substitute therefor “Mesh screening shall be as shown on the drawings, fabricated of steel wire mesh securely clinched into the panel frames. Frames shall be fabricated of steel tubes and channels with welded construction.”
 - c. At the end of the sentence “Materials, fabrication...at the play areas,” add “and railing systems”.

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d. Delete "at play area shall" and substitute therefor "at all play areas, transition area and sewage ejector area shall".

27) Page 05500A-13, Paragraph 2.24: Immediately after this paragraph, insert the following:

"2.25 MONITOR BRACKET

Provide monitor brackets at all monitor locations as indicated on the drawings, unless otherwise noted.

Provide monitor bracket that have adjustable tilt and swivel. Monitor brackets shall be wall mounted wherever possible. Provide additional fasteners as required to support from gypsum board walls and masonry walls. Where support is at gypsum board walls, provide heavy-duty metal stud blocking and vertical heavy duty metal studs within width of said wall. (This includes, but is not limited to, providing extension column kits.

Where ceiling mounted monitor bracket is necessary, provide all additional structural elements such as purlins, etc. that is necessary to adequately support the wall bracket and monitor from the structure above.

At all monitor brackets, provide VCR attachment.

All monitor brackets shall be colored black."

28) Page 05500A-13, Paragraph 2.25 (see above): Immediately after this paragraph, insert the following:

"2.26 FLAT FILES

Flat file shall be heavy duty cold rolled steel, finished with baked-on coats of primer and finish enamel. Door face and body shall be 7 gauge. Flush mounting frame or recessed mounting brackets shall be 7 gauge thickness. Side panels shall be 16 gauge. Assembly shall be lined with cushion material. Hinge shall be 3/16" thick.

Provide all necessary hardware for finished product.

Drawer slides shall be heavy duty with a load rating of 175 Pound Class. Extensions shall be full extension slides. Drawer slides shall have progressive movement on precision steel ball bearing.

Finish shall be white, including all exposed surfaces and drawings (inside and outside)."

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- 29) Section 06200: Immediately after this section, insert the attached Section 06650 SOLID POLYMER (SOLID SURFACING) FABRICATION, dated 10/00.
- 30) Page 07600A-5, Paragraph 2.1.2: Delete this paragraph.
- 31) Page 07600A-5, Paragraph 2.1.8: Delete this paragraph.
- 32) Page 07600A-5, Paragraph 2.1.9: Delete this paragraph.
- 33) Page 07600A-5, Paragraph 2.1.10: Delete “Type 302 or 304; fully annealed, dead soft temper.” and substitute therefor “Type 304; soft annealed, with No. 2D finish, except where harder temper is required for forming or performance; minimum 0.0187 inch thick.”
- 34) Page 07600A-5, Paragraph 2.1.12: Change the following:
- a. Delete “Electro-sheet copper not less than 5 ounces, factory coated both sides with acid- and alkali-resistant bituminous compound cont less than 6 ounces per square foot or factory covered both sides with asphalt-saturated cotton fabric, asphalt saturated glass-fiber fabric, or with 40 pound reinforced kraft paper bonded with asphalt.”
 - b. Delete “0.01 inch” and substitute therefor “0.0187 inch”.
 - c. Delete “Other through-wall flashing....are met” and substitute therefor “Stainless steel through-wall flashing material shall meet the following performance criteria. Provide harder tempered stainless steel as required for full compliance:”.
- 35) Page 07600A-6, Paragraph 2. 2: Change the following:
- a. Delete “downspout from” and substitute therefor “downspout boot from”.
 - b. Delete “above grade” and substitute therefor “above grade at each downspout”.
- 36) Page 07600A-7, Paragraph 2.6: Delete “wall and roof openings” and substitute therefor “wall and roof openings. Scupper linings shall be type 304 stainless steel, 28 gauge”.
- 37) Page 07920-2, Paragraph 1.2: Delete “Oil and Resin-Based Sealants”
- 38) Page 07920-3, Paragraph 1.2.1: After “mixing instructions,” add “location for use,”
- 39) Page 07920-5, Paragraph 2.4.1: Change the following:
- a. After the first sentence, add the following: “Application: May be used in joints with moderate movement and when immersed in water.

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- b. Insert the following paragraph:

“2.4.2 Butyl Rubber Base

Application: Where filler may be exposed to view and resilience is required for visually exposed concrete panels, masonry and other structures

2.4.3 Latex

Application: Perimeter interior joints between interior wall surfaces and frames of interior doors, windows, storefronts, elevator entrances, and similar joints, and all exposed interior joints not specifically indicated as elastomeric sealants

2.4.4 Elastomeric

Application: Control and expansion joints in cast-in-place concrete, unit masonry; exterior insulation and finish systems; joints between different materials; joints between steel and other materials; exterior perimeter joints between frames of doors, windows, storefronts, louvers, and other exterior wall joints.”

- 40) Page 08100-2, Paragraph 1.4: Add the following:

a. Sound Rated Door Assemblies: Provide sound control door that are identical to assemblies whose STC ratings are determined per ASTM E 90 and ASTM E 413 by a qualified independent testing agency. A qualified independent testing agency is an acoustical laboratory accredited by the National Voluntary Laboratory Accreditation Program (NVLAP) of the National Institute for Science and Technology (NIST).

b. Fire-Rated Door Assemblies: Provide units that comply with NFPA 80, are identical to door and frame assemblies whose fire resistance characteristics have been determined per ASTM E 152, and that are labeled and listed by UL, Warnock Hersey, or another testing and inspecting agency acceptable to authorities having jurisdiction.

c. Doors shall be provided to conform with the Americans with Disabilities Act Accessibility Guidelines (ADAAG) and State and Local Regulations.

d. Provide 47 STC-rated sound door and frame assembly at doors B01-1, B01-6, G02-4, G03, G15-1, 106-2, 107-3, 108-1, 108-2, 112-2, 115-2, 116-2, 207-1, 215-1, 215-2, 224, 227-4, 310-1, 310-2, 311-1, 311-2, 311-4.

- 41) Page 08100-4, Paragraph 2.1.2: Immediately following this paragraph, insert the following:

“2.1.3 Sound Doors and Frames

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Doors 16 gauge minimum commercial quality, level, cold rolled steel conforming to ASTM A366 or hot rolled, pickled and oiled steel conforming to ASTM A569 and free of scale, pitting, or surface defects.

Frames 14 gauge minimum commercial quality, level, cold rolled steel conforming to ASTM A366 or hot rolled, pickled and oiled steel conforming to ASTM A569 and free of scale, pitting, or surface defects.”

42) Page 08100-4, Paragraph 2.2: Add the following:

“Doors to Music Room, Media Center and all exterior doors shall be provided with weatherstripping at heads, jambs, and meeting stiles.

Weatherstripping shall be silicone treated wool pile inserted in a corrosion-resistant steel or extruded aluminum-alloy housing at three sides of door. Weatherstripping at meeting stiles of pairs of doors shall be adjustable weatherstrip astragal with stainless steel backing. Weatherstripping shall be mortised into the door edges, or frame, or both, as required to suit the conditions. Weatherstripping shall be designed for easy removal and replacement.”

43) Page 08120-12, Paragraph 2.5.9: Change the following:

a. Delete “exterior doors shall be” and substitute therefor “exterior doors (including those to Play Areas) shall be”.

b. Delete “aluminum-alloy housing” and substitute therefor “aluminum-alloy housing at three sides of door”.

44) Section 8210: Delete this section in its entirety and substitute therefor Section 08210 WOOD DOORS, dated 09/99.

45) Page 08550-3, Paragraph 2.1: Add the following:

“Provide aluminum clad wood windows as shown on the drawings at all windows of existing building.

At Contractor's option, the following assembly meeting all performance criteria specified for aluminum clad wood windows may be used. If used, the entire assembly shall be used rather than isolated components:

A. Solid wood blocking as required by the window manufacturer.

B. Profiles/Cladding/Trim: Hollow extruded aluminum profiles to match all existing wood profiles including brickmold, vertical and horizontal mullions and sills. Aluminum shall not be less than 0.70.

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C. Muntins: Simulated Divided Lites: 7/8-inch wide. Exterior bars 0.055 inch thick extruded aluminum. Interior bars to be wood to match the exterior muntin in profile and design. Bars shall be adhered to glass with double coated acrylic foam tape with a polyurethane spacer to match muntin pattern.

D. Batt insulation to fully fill all voids between wood blocking and aluminum profiles/cladding/trim.

E. Silicone sealant continuously at all exposed joints.

F. Aluminum Finishes for aluminum cladding and aluminum trims: High-Performance Organic finish: Fluoropolymer Two Coat System: Manufacturer's two coat thermo cured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 2605. Color and Gloss shall match existing from manufacturer's full range of colors."

46) Page 08550-4, Paragraph 2.3: Delete "ASTM D 3656, Class 2, 18 by 14 mesh, color dark bronze insect screens. Aluminum frames to meet SMA 1004" and substitute therefor

"At all wood windows on the Second and Third Floors, provide ASTM D 3656, Class 2, 18 by 14 mesh, color dark bronze insect screens. Aluminum frames to meet SMA 1004.

At all wood windows on the Basement and First Floors, provide insect screens that also serve as security screens. Total frame dimensions shall be 4.0 inch x 1.5 inch with minimum wall of thicknesses of .125 inches. Total frame shall weigh 2.0 pounds per foot. Corners shall be electrically welded and ground smooth.

Insect screens that are used as security screens shall be 12 mesh per inch, 0.028 inch stainless steel wire cloth continuously secured. Tensile strength shall test not less than 1600 pounds per linear inch after weaving. Color to be dark bronze.

Insect screens that are used as security screens shall have hardware that consists of concealed detention lock, simultaneously actuating hardened steel bolts, two or more plated steel concealed detention hinges (3.5 inches x 0.125 inches with .250 pins) and all necessary installation hardware.

Insect frame finish shall be pigmented organic coating AAMA 603 or 605 or baked anodic coating. Color to match windows."

47) Page 08550-4, Paragraph 3.1.2: Delete "Install screen" and substitute therefor "Install insect/security screen".

48) Page 08805-3, Paragraph 2.1.4: Change the following:

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a. Add paragraph "Glazing gaskets include; 3/16"preshimmed butyl or PVC foam tape exterior, 3/16" dense neoprene or EPDM wedge interior or other suitable compression bulb of either EPDM or neoprene, 3/16" dense neoprene setting blocks located at quarter points."

b. Delete the first line in the schedule.

c. Delete "Clear float 1/4 inch thick" and substitute therefor "Tempered, 1/4 inch thick".

d. Delete "Same as outer pane" and substitute therefor "'1/4 inch thick".

49) Page 09640A-3, Paragraph 2.1:Change the following:

a. At the second sentence, after maple, add: '(to be used at Gymnasium)'.

b. At the third sentence, delete "and white oak" and substitute therefor "oak (to be used at stage)".

50) Page 09640A-4, Paragraph 3.2: Immediately after this paragraph, insert the following:

"3.3 SANDING AND SEALING

Flooring shall be sanded to a smooth, even, uniform finish without burns. A minimum of three sanding cuts, each with a finer sandpaper, shall be made. A heavy drum-type sander shall be used for floors, except a disc-type sander will be permitted for the final cut on strip flooring. Either the first pass or the second pass of the drum-type sander shall be at an angle of 45 degrees to the grain; other passes of the drum-type sander shall be in the direction of the grain of strip flooring. Edges not reached by the sander shall be finished with an edger or by hand methods. The final sanding shall be performed at a time and in a manner that will permit application of the first seal coat as specified in Section 09900 PAINTS AND COATINGS to be completed within 8 hours after completion of sanding. The flooring shall be left clean and ready to receive the finishing materials."

51) Section 09650: Delete this section and substitute the attached Section 09650 RESILIENT FLOORING, dated 08/02.

52) Section 09680: Delete this section and substitute the attached Section 09680A CARPET, dated 05/01.

53) Section 09920: Delete this section and substitute the attached Section 09900 PAINTS AND COATINGS, dated 02/0.

54) Page 10100A-4, Paragraph 2.5: Change the following:

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a. Delete “ Unless otherwise indicated, provide wall mounted and ceiling mounted motorized projection screens. Wall mounted and ceiling mounted” and substitute therefor: “Material and Viewing Surface of the Projection Screens: Provide screens manufactured from mildew and flame resistant fabric of type indicated for each type of screen specified and complying with the following requirements:

1. Matte white viewing surface with grain characteristics complying with FS GG-S-00172D(1) for Type A screen surface.

2. Material: Vinyl coated glass fiber fabric.

3. Mildew Resistance: Provide mildew resistant screen fabrics as determined by FS 191A/5760.

4. Seams: Where length of screen indicated exceeds maximum length produced without seams in fabric specified, provide screen with horizontal seam placed as follows:

a. At top of screen at juncture where maximum length viewing surface is exceeded.

5. Seamless Construction: Provide screens less than 84 inches by 84 inches without seams.

6. Edge Treatment: Black masking borders.

Manually Operated Screens: Provide manufacturer's standard spring roller operated units designed and fabricated for wall or ceiling installation and consisting of case, screen, mounting accessories, and other components necessary for a complete installation.

1. Screen Case: Fabricated in 1 piece from steel sheet not less than 0.0299 inch, with flat back design and vinyl covering or baked enamel finish. Provide end caps with integral roller brackets and universal mounting brackets, finished to match end caps, for wall or ceiling mounting.

2. Screen Mounting: Top edge securely anchored to a 3 inch diameter, rigid steel spring roller; bottom edge formed into a pocket holding a tubular metal slat, with ends of slat protected by plastic caps, and saddle and pull attached to slat by screws.

Provide wall mounted motorized projection screen at Media Center.”

b. Add the following:

“At motorized projection screen provide Single Station Control: 3 position control switch with metal device box and cover plate for flush wall mounting and for connection to 120 V, ac power supply.

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a. Provide key operated switch.

1. Furnish switch to Electrical Contractor for installation.
2. Motor: Provide either motor in roller or end mounted motor.
3. Motor in Roller: Instant reversing motor of size and capacity recommended by screen manufacturer with permanently lubricated ball bearings, automatic thermal overload protection, preset limit switches to automatically stop screen in up and down positions, and positive stop action to prevent coasting. Mount motor inside roller with vibration isolators to reduce noise transmission.
4. End Mounted Motor: Instant reversing, gear drive motor of size and capacity recommended by screen manufacturer with permanently lubricated ball bearings, automatic thermal overload protection, preset limit switches to automatically stop screen in up and down positions, and positive stop action to prevent coasting. Locate motor in its own compartment.
5. Screen Mounting: Top edge securely anchored as rigid metal roller and bottom edge formed into a pocket holding a 3/8 inch diameter, metal rod with ends of rod protected by plastic caps.

Provide additional anchorage as required.”

55) Page 10165-3, Paragraph 1.5: Add the following: “Toilet partition panels will be inspected prior to installation. Bowed panels will be rejected and not be installed. Panels bowed more than 1/8" in 3 feet when measured with a straight edge will be rejected and replaced.”

56) Page 10165-3, Paragraph 2.1: Change the following:

- a. Delete “high density polyethylene” and substitute therefor “solid polymer”.
- b. Add paragraph “For additional information, see spec Section 06650 SOLID POLYMER (SOLID SURFACING) FABRICATIONS.”

57) Page 10165-4, Paragraph 2.2: Add the following: “See paragraph 2.1, this section, for more information.”

58) Page 10165-4, Paragraph 2.4: Delete “high density polyethylene” and substitute therefor “solid polymer”.

59) Page 10165-4, Paragraph 2.7: Delete “high density polyethylene” and substitute therefor “aluminum”.

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- 60) Page 10165-4, Paragraph 2.8: At the end of the second sentence, add “full height (continuous) ”piano hinge””.
- 61) Page 10165-5, Paragraph 3.1: Delete all references to “1/4-20” and substitute therefor “5/16 inch diameter”.
- 62) Section 10165: Immediately after this section, insert the attached Section 10430 EXTERIOR SIGNAGE, dated 07/02.
- 63) Section 10430: Immediately after this section, insert the attached Section 10440 INTERIOR SIGNAGE, dated 07/02.
- 64) Page 10500-5, Paragraph 2.1.1: Delete “0.239” and substitute therefor “0.0239”.
- 65) Page 10523-3, Paragraph 2.1: At the end of the second sentence, add “and in the vicinity of electronic equipment. Foam type extinguishers are not permitted.”
- 66) Page 10600-6, Paragraph 2.4: Immediately after this paragraph, insert the following:

“2.5 CUBICLE CURTAIN AND TRACK

Curtain fabrics shall be flame resistant and identical to those that have passed NFPA 701 when tested by a testing and inspecting agency acceptable to authorities having jurisdiction. Identify fabrics with appropriate markings of applicable testing and inspecting agency.

Curtains shall consist of flameproof nylon reinforced anti-bacterial vinyl material with nickel plated brass grommets. Curtains shall be 7 feet high, mounted at 8 feet above finished floor. Color shall be yellow.

Curtain tracks shall be extruded anodized aluminum box channel type. Provide additional structural support such as purlins and other elements to securely fasten assembly to existing structure.

Curtain carriers shall be rustproof wire and bead chain riding a nylon wheeled carrier.”

- 67) Page 10800-6, Paragraph 2.5.6: Add the following: “Installed bars shall be capable of withstanding a 500 pound vertical load without coming loose from the fastenings and without obvious permanent deformation.”
- 68) Page 11400A-18, Paragraph 1.5.14: After the last sentence of the second paragraph, add the following: “Contractor shall make a detailed itemized bid of the primary Kitchen Equipment item. Contractor shall also make a detailed itemized bid of the proposed substitution Kitchen Equipment item.”

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69) Page 12303-5, Paragraph 2.2: Add the following:

“a. Hardwood plywood (exposed and semi-exposed) shall conform to ANSI/AHA A135.4, Class 1 tempered, smooth, 2 sides.

b. Particleboard shall be as follows:

1. Cabinets and Countertops: Provide Premium Industrial Grade, conforming to the Commercial Standards CS-236-66 Type 1, Density B, Class 2, Property Requirements, (CS 1B2), also known as ANSI A208.1-1979.

a. Density, lb. per cu.ft.: 47

b. Modulus of Rupture, lb. per sq.in.: 2500

c. Modulus of Elasticity, lb. per sq.in.: 450000

d. Internal Bond, lb. per sq.in.: 100

e. Thickness Swell (24 hr immerse): 4 percent

f. Moisture Content percent by weight: 6.0

g. Screw Holding: Face 330 Edge 250

h. Surface Strength lb. per sq.in.: 275

i. Hardness lb.: 900

c. Solid lumber or plywood concealed members, solid wood to be hardwood, kiln-dried, select Poplar, Fir, or mill option lumber and plywood shall be Baltic Birch 7-ply.

d. Extension drawer slides: BHMA A156.9, Drawers 24" wide and under shall have 75 pound load capacity slides. Drawers over 24" wide shall have 100 pound load capacity slides.

e. Semiconcealed hinges: BHMA A156.9, steel, dull chromium (US26D), flush, button tip, loose pin, not less than 1 1/2" high, minimum .050 gauge, 3/4" to 1 1/8" offset as required.

f. Full surface hinges: BHMA A156.9, steel, dull chromium (US26D), flush, button tip, loose pin, not less than 1 1/2" high, minimum .050 gauge, 3/4" to 1 1/8" offset as required.

g. Bar type pulls: BHMA A156.9, forged bronze, dull chromium plated (US26D), formed of half round bar stock, overall length 3 1/4", center to center 3" with a 1" minimum

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projection. Pulls shall be through bolted through the door with machine screws threaded into pull, with stop washers under the heads of the screws.

h. All cabinet doors and drawers shall be locked: Locks, keying, and keys: Locks: deadbolt type, 7 disk tumbler mechanism, solid brass. Finish shall be dull chromium plates (US26D). Key each room differently. Master key building. All case cabinet and drawer locks within a room shall be keyed alike, and a total of 6 keys provided for each such set of locks. Provide 6 masterkeys for each designated area or school. Provide schematic drawings of the system including codes, with two copies for the Contracting Officer.

i. Cabinet doors swinging in pairs, shall be provided with a bolt on the inactive leaf. Bolts shall be surface mounted sliding type. For small cabinet doors bolts shall be bronze metal, dull chromium plates (US26D) not over 4" in length, mounted on the bottom inside face of the door. For larger cabinets provide top and bottom surface bolts conforming to the foregoing criteria, with the bottom bolt not over 6" in length and the top bolt of sufficient length to bring the knob not over 5'-7" from the finish floor. Both bolts to be mounted on the inside face of the door near the lock stile edge

j. Adjustable Shelving Supports: Adjustable shelving shall be supported on shelf standards and brackets. Standards shall be mortised flush with the end wall of the cabinets. Finishes shall be bright zinc plated for both the foregoing.

k. Hanger Rods: Hanger rods shall be not less than 1 1/16" diameter stainless clad steel tubing, mounted on heavy duty flange brackets. At wide wardrobes provide adjustable center hangers not more than 48" on centers to provide additional support for the hanger rod.

l. File Drawer: 100 pound minimum, one pair per drawer, side mounted.

m. Pencil Drawer: 3/4 extension, one pair per drawer, side mounted.

o. Keyboard Slide (suspended drawer): 3/4 extension.

p. Door Cushions: Door corners, opposite hinge side to receive plastic round cushion.

q. Cable Hole Covers: High impact ABS cable hole cover, 2-1/2 inch inside diameter, with spring closure in top."

70) Page 12495-3, Paragraph 3.2: Add the following: "Contractor shall provide window blinds and window shades at all classroom windows and at all windows in Toilet B14, Treatment Room 102D and Toilet 102H."

71) Section 13215: (See Item 16 above.) Delete this section in its entirety and substitute therefor the attached Section 02791 PLAYGROUND PROTECTIVE SURFACING, dated 06/01.

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- 72) Page 13851-10, Paragraph 2.2: In line 7, delete “15 minutes” and substitute therefor “30 minutes”.
- 73) Section 13930: Delete this section in its entirety and substitute therefor the attached Section 13930A WET PIPE SPRINKLER SYSTEM, FIRE PROTECTION.
- 74) Section 14210: Delete this section in its entirety and substitute therefor the attached Section 14210A ELEVATORS, ELECTRIC, dated 08/01.
- 75) Page 16264-8, Paragraph 2.2.2.1: In line 2, delete “200 Kw” and substitute therefor “150 Kw”.
- 76) Page 16264-11, Paragraph 2.2.3.5: Delete all asterisks.
- 77) Page 16264-19, Paragraph 3.5.2.2.b: Delete this paragraph.
- 78) Page 16721-18, Paragraph 3.7: Immediately after this paragraph, delete from “SCHOOL INTERCOM AND PROGRAM EQUIPMENT.....to....End of Section”

DRAWINGS:

- 79) Sheet C100: Immediately after Note 27, add:

“28. All work shall be in compliance with all applicable codes and government regulations including but not limited to: BOCA 1996, NFPA 1999. Where specified or indicated requirements of more current versions of codes, regulations, etc conflict with that of the DC Government, the more stringent of the two shall govern.”

- 80) Sheets C101, C102, C202, C203, C411, C501, C502, C512, C514, C601, C801, A2-02, A2-03, A3-01, A3-02, A3-03, A3-07, A3-08, A5-01, A6-05, A6-06, A7-01, A9-1A, A10-02, A10-03, A10-04, A10-05, A10-07, A10-08, M-02, M03, M04, M05, M06, M07, M08, M09, M10, M11, M12, P02, P04, P09, P11, P13, P15, ES01, ES02, E01, E04, E06, E08, E10, E11, E12, E14, E15, E16, E17, E18, E20, E21, E23, EFC1, EFC2, EFC3, EFC4, EFC5, EFC6, EFC7, EFC8, EFC9: Delete these sheets in their entirety as originally issued and substitute therefor the attached revised like-numbered sheets, dated 9-11-02. Note these drawings state “Amendment 1 in the title block, but apply to this Amendment 0002.
- 81) Sheet A10-12: Immediately after this sheet, add the attached Sheet A10-13, dated 9-11-02. Note this drawing states “Amendment 1 in the title block, but apply to this Amendment 0002.

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SOURCES FOR REFERENCE PUBLICATIONS

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PART 1 GENERAL

1.1 REFERENCES

Reference publications are cited in other sections of the specifications along with identification of their sponsoring organizations. The addresses of the sponsoring organizations are listed below, and if the source of the publications is different from the address of the sponsoring organization, that information is also provided.

AMERICAN CONCRETE INSTITUTE (ACI)

P.O. Box 9094
Farmington Hills, MI 48333-9094
Ph: 248-848-3700
Fax: 248-848-3701
Internet: <http://www.aci-int.inter.net>

AGRICULTURAL MARKETING SERVICE (AMS)

Seed Regulatory and Testing Branch
USDA, AMS, LS Div.
Room 209, Bldg. 306, BARC-East
Beltsville, MD 20705-2325
Ph: 301-504-9430
Fax: 301-504-5454 Internet: <http://www.ams.usda.gov/lsg/ls-sd.htm>
e-mail: james_p_triplett@usda.gov

AIR CONDITIONING AND REFRIGERATION INSTITUTE (ARI)

4301 North Fairfax Dr., Suite 425
ATTN: Pubs Dept.
Arlington, VA 22203
Ph: 703-524-8800
Fax: 703-528-3816
E-mail: ari@dgsys.com
Internet: www.ari.org

AIR CONDITIONING CONTRACTORS OF AMERICA (ACCA)

1712 New Hampshire Avenue, NW
Washington, DC 20009
Ph: 202-483-9370
FAX: 202-232-8545

AIR DIFFUSION COUNCIL (ADC)

104 So. Michigan Ave., No. 1500
Chicago, IL 60603
Ph: 312-201-0101
Fax: 312-201-0214

AIR MOVEMENT AND CONTROL ASSOCIATION (AMCA)

THOMSON ELEMENTARY SCHOOL
RENOVATION AND ADDITION

30 W. University Dr.
Arlington Heights, IL 60004-1893
Ph: 847-394-0150
Fax: 847-253-0088

ALUMINUM ASSOCIATION (AA)

900 19th Street N.W.
Washington, DC 20006
Ph: 202-862-5700
Fax: 202-862-5164
Internet: www.aluminum.org

AMERICAN ARCHITECTURAL MANUFACTURERS ASSOCIATION (AAMA)

1827 Walden Ofc. Sq.
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Ph: 847-303-5664
Fax: 847-303-5774
Internet: www.aamanet.org

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS
(AASHTO)

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Internet: www.aashto.org

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P.O. Box 12215
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AMERICAN BOILER MANUFACTURERS ASSOCIATION (ABMA)

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AMERICAN CONCRETE PIPE ASSOCIATION (ACPA)

222 West Las Colinas Blvd., Suite 641
Irving, TX 75039-5423
Ph: 972-506-7616
Fax: 972-506-7682
Internet: <http://www.concrete-pipe.org>
e-mail: info@concrete-pipe.org

AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS (ACGIH)

1330 Kemper Meadow Dr.
Suite 600
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Fax: 202-962-4776

AMERICAN RAILWAY ENGINEERING ASSOCIATION (AREA)

8201 Corporate Dr., Suite 1125
Landover, MD 20785
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Fax: 301-459-8077

AMERICAN SOCIETY FOR NONDESTRUCTIVE TESTING (ASNT)

1711 Arlingate Lane
P.O. Box 28518
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Ph: 800-222-2768
Fax: 614-274-6899

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

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Internet: www.astm.org

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Internet: <http://www.ashrae.org>

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Fax: 212-591-7674
Internet: www.asme.org

AMERICAN SOCIETY OF SANITARY ENGINEERING (ASSE)

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E-mail: asse@ix.netcom.com

AMERICAN WATER WORKS ASSOCIATION (AWWA)

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Denver, CO 80235
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Fax: 303-795-2114
Internet: www.awwa.org

AMERICAN WELDING SOCIETY (AWS)

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Internet: www.amweld.org

AMERICAN WOOD-PRESERVERS' ASSOCIATION (AWPA)

3246 Fall Creek Highway, Suite 1900
Grandbury, TX 76049-7979
Ph: 817-326-6300
Fax: 817-326-6306

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Springfield, VA 22150
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Fax: 205-257-2540
Internet: <http://www.aeic.org/index.htm>
E-Mail: veazey-white@apc.com

ASSOCIATION OF HOME APPLIANCE MANUFACTURERS (AHAM)

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Ph: 312-984-5800
Fax: 312-984-5823
Internet: <http://www.aham.org>

ASSOCIATION OF IRON AND STEEL ENGINEERS (AISE)

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Pittsburg, PA 15222-1004
Ph: 412-281-6323

BIFMA INTERNATIONAL (BIFMA)

2680 Horizon Drive SE, Suite A-1
Grand Rapids, MI 49546-7500
Ph: 616-285-3963
Fax: 616-285-3765
Internet: www.bifma.com
E-mail: email@bifma.com

BRICK INSTITUTE OF AMERICA (BIA)

11490 Commerce Park Dr., Suite 308
Reston, VA 22091
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-- End of Section --

SECTION 02791

PLAYGROUND PROTECTIVE SURFACING
06/01

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 136	(1996a) Sieve Analysis of Fine and Coarse Aggregates
ASTM D 412	(1998a) Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers - Tension
ASTM D 648	(2000) Deflection Temperature of Plastics Under Flexural Load
ASTM D 1557	(1991; R 1998) Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/cu. ft. (2,700 kN-m/cu.m.))
ASTM D 2047	(1999) Static Coefficient of Friction of Polish-Coated Floor Surfaces as Measured by the James Machine
ASTM D 2261	(1996) Tearing Strength of Fabrics by the Tongue (Single Rip) Procedure (Constant Rate-of-Extension Tensile Testing Machine)
ASTM D 6112	(1997) Compressive and Flexural Creep and Creep-Rupture of Plastic Lumber and Shapes
ASTM E 1912	(1998) Standard Guide for Accelerated Site Characterization for Confirmed or Suspected Petroleum Releases
ASTM F 1015	(1986; R 1999) Relative Abrasiveness of Synthetic Turf Playing Surfaces
ASTM F 1292	(1999) Impact Attenuation of Surface Systems Under and Around Playground Equipment
ASTM F 1487	(1998) Standard Consumer Safety Performance Specification for Playground Equipment for Public Use

CONSUMER PRODUCT SAFETY COMMISSION (CPSC)

CPSC Pub No 325

(1994) Handbook for Public Playground
Safety

1.2 DEFINITIONS

Critical Height: The fall height at which the protective surfacing meets the requirements of ASTM F 1292.

Designated Play Surface: Any elevated surface for standing, walking, sitting, or climbing; or a flat surface a minimum 2 inches wide having up to a maximum 30 degree angle from horizontal. In some play events the platform surface will be the same as the designated play surface. However, the terms should not be interchanged as they do not define the same point of measurement according to ASTM F 1487.

Head Injury Criteria (HIC): A measure of impact severity that considers the duration over which the most critical section of the deceleration pulse persists as well as the peak level of that deceleration. Head impact injuries are not believed to be life threatening if the HIC does not exceed a value of 1,000.

Impact Attenuation: The ability of protective surfacing to reduce and dissipate the energy of an impacting body.

Loose Fill: Consisting of small independent movable components such as sand, gravel, or wood chip. The percent of fine material in the loose fill affects its compression properties from rainfall.

Maximum Equipment Height: The highest point on the equipment (i.e.: roof ridge, top of support pole).

Play Event: A piece of manufactured playground equipment that supports one or more play activities.

1.3 CHILD SAFETY AND ACCESSIBILITY STANDARDS

The perimeters of the play event use zone shall be measured in accordance with the requirements of Section 02882 PLAYGROUND EQUIPMENT.

1.3.1 CHILD SAFETY

Synthetic surfacing systems installed in the use zones shall meet or exceed the impact attenuating performance requirements as follows. The surfacing critical height value shall yield up to both a maximum 200 G's peak deceleration, and a maximum 1,000 Head Injury Criteria (HIC) value for a head-first fall from the play event in accordance with CPSC Pub No 325 and ASTM F 1292. The protective surfacing should have a minimum critical height value equal to the height of the highest designated play surface. Measuring fall heights for play events is defined in paragraph FALL HEIGHT.

Sand, gravel, and wood products shall not be installed over a concrete or bituminous subsurface per CPSC Pub No 325.

1.3.2 CHILD ACCESSIBILITY

The accessibility requirement in accordance with ASTM F 1487 includes the following: When the play event use zone consists of a protective surfacing

rated as inaccessible, at least one accessible route shall be provided from the use zone perimeter to the play event. When there is more than one of the same play activity provided, only one shall meet accessibility requirements i.e.: one swing seat or one spring rocking play event). When the access and egress points are not the same for a play event, an accessible route shall be provided to both. The accessible route shall access all accessible play events and elements. The protective surfacings that meet accessibility are synthetic surfacing and engineered wood fiber per ASTM E 1912. When the accessible surface is within the use zone, it shall meet the requirements of paragraph CHILD SAFETY

1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Shop Drawings.

Scale drawings defining the revised use zone configuration.

Finished Grade and Underground Utilities

Finished grade, underslab utilities, storm-drainage system.

SD-03 Product Data

Synthetic Surfacing

Manufacturer's descriptive data; catalogue cuts; and the latest edition of ASTM F 1487 and CPSC Pub No 325.

Manufacturer's specifications, handling and storage requirements, installation procedures, and safety data sheets to include warnings and critical height performance standards for synthetic surfacing.

A list to include part numbers of furnished protective surfacing materials and components for synthetic surfacing.

Delivery schedule and manufacturer name for synthetic surfacing plus delivery, storage and handling information.

Impact attenuation and critical height performance for each thickness of synthetic surfacing provided.

Manufacturer's Qualification

Name of the owner or user; service or preventive maintenance provider; date of the installation; point of contact and telephone number; and address for 10 sites.

Play Area

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Playground equipment and site furnishings installed.

Temperature Limitation

Temperature limitation for applying adhesive.

Adhesive

EPA registered uses, toxicity levels, and application hazards.

Color

Two color charts displaying surfacing colors, color granule percentages and finishes.

SD-04 Samples

Synthetic Surfacing

- a. Synthetic Surfacing: A minimum 2 by 2 inch sample.

SD-06 Test Reports

Synthetic Surfacing

Chemical composition, color granule percentage, and test results to which material has been subjected; identifying each material and component containing recycled materials and showing the estimated percentage of recovered material content. Freezing temperature life-cycle durability.

SD-07 Certificates

Materials

Prior to the delivery of materials, certificates of compliance attesting that materials meet the specified requirements. Certified copies of the material certificates shall include composition and tests to which the material has been subjected.

Manufacturer's Qualification

Certificate of Insurance AA rated for a minimum one million dollars.

Manufacturer's Representative

The individual's name, company name and address, and playground safety training certificate.

Installer's Qualification

The installer's company name and address, and training and experience certification.

Substitution

Technical representative's written approval.

Child Safety and Accessibility Evaluation

Record of measurements and findings by the certified playground safety inspector. Verification that installed protective surfacing meets manufacturer's recommendations and paragraph CHILD SAFETY AND ACCESSIBILITY STANDARDS.

SD-10 Operation and Maintenance Data

Maintenance Instruction

Two bound copies of manufacturer's operation and maintenance manuals. The Contractor shall include manufacturer supplied spare parts.

1.5 DELIVERY, STORAGE, AND HANDLING

A delivery schedule shall be provided at least 10 calendar days prior to the first day of delivery. Protective surfacing material shall be delivered, handled, and stored in accordance with the manufacturer's recommendations. The storage area shall be as designated. The materials shall be stored in a dry, covered area until installed.

1.6 INSPECTION

Protective surfacing material shall be inspected upon arrival at the job site for meeting specified quality. Unacceptable materials shall be removed from the job site.

1.7 MANUFACTURER'S QUALIFICATION

Protective surfacing should have been installed in a minimum 10 sites and been in successful service for a minimum 5 year calendar period. The manufacturer shall provide a Certificate of Insurance AA rated for a minimum one million dollars covering both product and general liability.

1.8 INSTALLER'S QUALIFICATION

The installer shall be certified by the manufacturer for training and experience installing the protective surfacing.

1.9 WARRANTY

Rubber surfacing is to be warranted against defects in material and workmanship and shall include conformance to ASTM F1292-93 during the warranty period of 5 years.

Rubber surfacing is to be warranted against defects caused by delamination, peeling or raveling of shredded rubber strands or granules; chalking or fading of color beyond the expected range; and defects that could cause a child to trip.

Contractor shall be responsible for labor and materials to remove and reinstall defective rubber surfacing during the warranty period at no cost to the Owner.

Any rubber surfacing judged not acceptable during the warranty period is to be replaced as soon as weather allows upon written notification by the Contracting Officer to the Contractor.

The Owner shall reserve the right to submit representative samples of the rubber surfacing to an independent testing lab at any time during the length of the warranty period to verify the compliance of tiles with ASTM F1292-93. If rubber surfacing is not found to be in conformance, the Contractor will also be responsible for paying for testing costs.

1.10 TECHNICAL REPRESENTATIVE

1.10.1 Playground Areas

The technical representative for outdoor play areas shall be the Director of Public Works or designated representative. The design of these outdoor play areas shall be based on the play program and the age groups to be accommodated as determined by District of Columbia Public Schools.

1.11 MANUFACTURER'S REPRESENTATIVE

The manufacturer's certified playground safety inspector or the manufacturer's designated certified playground safety representative shall supervise the installation and adjustment of the protective surfacing to verify the installation meets the requirements of the manufacturer, this specification, and paragraph CHILD SAFETY AND ACCESSIBILITY STANDARDS.

PART 2 PRODUCTS

2.1 MATERIALS

Materials shall be the standard products of a manufacturer regularly engaged in the manufacture of protective surfacing and shall be similar to surfacing in satisfactory use a minimum 5 year calendar period. Protective surfacing consists of two systems; synthetic surfacing and loose fill surfacing.

2.2 SYNTHETIC SURFACING

Synthetic surfacing consists of a shredded rubber, uniform material manufactured in such a way that the top portion meets the requirements specified for wear surface.

Rubber surfacing shall be interlocking with 3" thick x 2-3/4" wide interlocks spaced at 2-3/4".

Rubber surfacing shall have a conical base (2 inches on center) that will allow drainage.

Rubber surfacing units shall be 22" x 44", typical.

Rubber surfacing and wear surface is a combined 3" thickness of uniform material.

2.2.1 Subbase

The subbase for synthetic surfacing shall be concrete with membrane waterproofing and protective board/coarse as specified in Section 07130.

2.2.2 Impact Attenuating Substrate

The substrate shall be uniform with the wear surface, and shall consist of

modular units. Recycled materials shall conform to EPA requirements in accordance with Section 01670 RECYCLED / RECOVERED MATERIALS.

2.2.3 Wear Surface

Wear surfaces consist of the following: a rubber sheet wear surface. The wear surface shall meet requirements of ASTM D 2047 for a minimum 0.8 coefficient of friction.

Rubber surfacing and wear surface is a combined 3" thickness of uniform material.

2.2.3.1 Rubber Wear Surface

Rubber wear surface shall consist of a smooth, uniform formulation of EPDM rubber granules bonded under pressure in the factory, and shall be a minimum 1 inch thick. Rubber surfacing shall consist of tire buffings, rubber granules mixed with clear urethane and EPDM granules.

2.2.4 Color

Blend EPDM granules as necessary to achieve the required colors as noted in the Color Schedule.

The areas indicated on the drawings under and immediately around each play structure shall be colored gray, in contrast to the surrounding color.

2.2.5 Adhesive

Adhesive shall be a two component polyurethane providing extremely high impact resistant bond and shall be installed as recommended by the manufacturer. The adhesive shall be non-toxic, resistant to ultraviolet light, and safe for children.

2.2.6 Transition Ramp

Provide transition ramps of the same material and color as surrounding rubber surfaces at doors as required.

PART 3 EXECUTION

3.1 PLAY AREA PREPARATION

Prior to installing the protective surfacing, verify the playground equipment and site furnishings are installed in accordance with Section 13215 PLAYGROUND EQUIPMENT.

3.1.1 Finished Elevation

The Contractor shall verify that finished elevations are as indicated; installation of the underslab utilities through the area has been completed; and installation of the storm-drainage system through the area has been completed. Damage to underslab utilities and facilities shall be repaired at the Contractor's expense.

3.1.2 Layout

The layout of the entire Play Area shall be staked before work begins. The location of all elements shall be staked to include the following: All play structures, use zones, support elements, structural elements and drains.

3.1.2.1 Use Zone

The use zone is defined as the area beneath and immediately adjacent to a play structure or equipment that is designated for unrestricted circulation around equipment; and on whose surface it is predicted that a user would land when falling from or exiting the equipment. Also, the use zone is associated with the following terms; "Clear Area," and "Fall Zone". The use zone shall be free of hard surfaces, objects or obstacles that a child could run into or fall on top of and be injured. The use zone perimeter shall meet or exceed the requirements of paragraph CHILD SAFETY AND ACCESSIBILITY STANDARDS.

3.1.2.2 Shop Drawings

When the use zone perimeter and play event configuration conflict with the requirements and paragraph CHILD SAFETY AND ACCESSIBILITY STANDARDS, shop drawings defining corrective measures shall be submitted to include the following: Adjustment to the play event with the use zone perimeter; use zone perimeter overlaps; fall height and critical height value.

3.1.3 Obstructions Below Slab

When obstructions below slab affect the work, shop drawings showing proposed adjustments shall be provided.

3.1.4 Substitution

Under no circumstances are substitutions to be allowed or protective surfacing to be selected without written approval from the Contracting Officer. Evaluate manufacturer substitutions for the critical height value with meeting the site conditions and paragraph FALL HEIGHT.

3.1.5 Subsurface

The subbase shall be installed in a true, even plane, and sloped to provide positive drainage as indicated.

Tolerance of the concrete or bituminous subbase shall be within a maximum 1/4 inch in 10 feet .

Concrete subbase shall be cured a minimum of 7 days. Curing compounds and other deleterious substances that adversely affect protective surface shall be removed. Surface shall be clean and dry.

3.1.6 Fall Height

3.1.6.1 General Requirements

The fall height is defined as the vertical distance between the finished elevation of the designated play surface and the finished elevation of the protective surfacing beneath it. For some play events the fall height and platform height are the same, while for other play events the fall height and maximum equipment height are the same. When the furnished play event

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fall height varies from the play event shown, shop drawings shall be provided defining the revised depth or type of protective surfacing to meet or exceed the requirements of paragraph CHILD SAFETY AND ACCESSIBILITY STANDARDS.

3.1.6.2 Measuring Fall Height

EQUIPMENT	MEASURING FALL HEIGHT
Composite Equipment Structure:	For a platform surrounded by protective barriers, measure from the platform finished elevation. For a platform surrounded by guardrails, measure from the guardrail top elevation.
Infant Crawl Area:	A maximum 24 inch height, measured from the crawl wall or barrier finished elevation.
Playhouse, Nonclimbable:	Measure from the designated play surface finished elevation.
Stationary Equipment, Climbable:	Measure from the maximum equipment height finished elevation.
Stationary Equipment, Nonclimbable:	Measure from the designated play surface finished elevation.

3.2 INSTALLING SURFACING SYSTEM

Surfacing edges shall fully interlocked. Fully cover the subsurface to ensure no hard surfaces are exposed. Maintain the full thickness required to meet paragraph CHILD SAFETY AND ACCESSIBILITY STANDARDS.

3.2.1 [Enter Appropriate Subpart Title Here]3.2.1.1 Rubber Surface

Rubber surfacing is to conform to ASTM C-67 and ASTM D-573 for weathering, ASTM E-303 for Skid Resistance, ASTM E-108 for Fire retardance, and ASTM F1292, F-355 for shock absorbance. Rubber surfacing shall conform to shock alteration values of less than 200 G-max and less than 1000 HIC for Critical Height of 8 ft. Rubber surfacing is to be in compliance with the American with Disabilities Act and the ASTM F 1951, Accessibility of Surfacing. Shop drawing submittals are to include documentation as done by an independent testing laboratory of test data for the specified depth to meet the minimum 8 feet critical height.

3.3 RESTORATION AND CLEAN UP

When the operation has been completed, the Contractor shall clean up and protect the Play Area room. Existing areas that have been damaged from the operation shall be restored to original condition at the Contractor's expense.

3.3.1 Clean Up

The Play Area room and play events shall be cleaned of all materials associated with the operation. Play events and surfaces shall be cleaned of dirt, stains, filings, and other blemishes occurring from shipment and installation. Cleaning methods and agents shall be as recommended by the manufacturer.

3.3.2 Disposal of Materials

Excess and waste material shall be removed and disposed of off Government property.

3.4 PROTECTIVE SURFACING ACCEPTANCE

3.4.1 Child Safety and Accessibility Evaluation

For fall heights of play equipment specified, see Spec Section 02882 "Playground Equipment", Paragraph 2.2.

When the protective surfacing is installed, the play events and protective surfacing shall be thoroughly inspected and measured to verify the playground meets manufacturer's recommendations, paragraph CHILD SAFETY AND ACCESSIBILITY STANDARDS, and paragraph FALL HEIGHT as follows: 1) secure anchoring; 2) all hardware and connectors are tight and below the wear surface; 3) sharp points, edges, and protrusions; 4) entanglement; and 5) pinch, crush, and shear points. Measure use zone distances to determine the area is free of hard surfaces, objects or obstacles. Determine exceptions to use zone overlaps occur in accordance with ASTM F 1487. Measure play event fall height and compare to critical height value for the thickness of installed synthetic surfacing. Measure play event fall height and depth of loose fill protective surfacing. Ensure installed chopped tire material is free from steel belts. Ensure the slide exit region has the required clear zone. The finished installation shall have the appearance of a single covering. Protective surfacing that does not comply shall be reinstalled. Hardware that does not comply shall be replaced. Ensure positive drainage for the area and the lowest elevation of protective surfacing subgrade has been provided. A written report describing the results of the evaluation shall be provided.

3.4.2 Spare Parts

Protective surfacing spare parts provided by the manufacturer shall be furnished.

3.4.3 Maintenance Instruction

The manufacturer's operation and maintenance manual describing the recommended preventive maintenance, inspection frequency and techniques, periodic adjustments, lubricants, and cleaning requirements shall be furnished.

3.5 RE-INSTALLATION

When re-installation is required, the following shall be accomplished. Re-install the product as specified. Provide new replacement materials supplied by the manufacturer (material acquisition of replacement parts is the responsibility of the Contractor). Damage caused by the failed installation shall be repaired at the Contractor's expense.

-- End of Section --

SECTION 02870A

SITE FURNISHINGS
06/01

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications shall be referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 36/A 36M	(2000) Carbon Structural Steel
ASTM A 48	(1994ael) Gray Iron Castings
ASTM A 48M	(1994el) Gray Iron Castings (Metric)
ASTM A 123/A 123M	(2000) Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A 153/A 153M	(2000) Zinc Coating (Hot-Dip) on Iron and Steel Hardware
ASTM A 500	(1999) Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
ASTM A 501	(1999) Hot-Formed Welded and Seamless Carbon Steel Structural Tubing
ASTM A 615/A 615M	(2000) Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
ASTM B 26/B 26M	(1999) Aluminum-Alloy Sand Castings
ASTM B 62	(1993) Composition Bronze or Ounce Metal Castings
ASTM B 108	(1999) Aluminum-Alloy Permanent Mold Castings
ASTM C 150	(1999a) Portland Cement
ASTM D 648	(2000) Deflection Temperature of Plastics Under Flexural Load
ASTM D 2990	(1995) Tensile, Compressive, and Flexural Creep and Creep-Rupture of Plastics
ASTM F 1487	(1998) Standard Consumer Safety Performance Specification for Playground Equipment for Public Use

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings.

Site Furnishing Standards

Drawings showing scaled details of proposed site furnishings, elevations for each type of site furnishing; dimensions, details, and methods of mounting or anchoring; shape and thickness of materials; and details of construction.

SD-03 Product Data

Site Furnishings

Manufacturer's descriptive data and catalog cuts.

Installation

Manufacturer's installation and maintenance instructions.

Materials

A listing indicating the furnishings provided have been in proven satisfactory use for at least 2 years.

SD-04 Samples

Finish

Two sets of color data for each furnishing displaying manufacturer's color selections and finishes, and identifying those colors and finishes proposed for use.

SD-06 Test Reports

Recycled Material

A report of site furnishing parts consisting of recycled materials. Product specification data, providing test information for deflection and creep in accordance with ASTM D 648 and ASTM D 2990 for site furnishings which use plastic lumber as a component, shall be submitted. The data shall provide a comparison of deflection and creep measurements to other comparable materials.

Testing

A report of post-installation test results.

1.3 DELIVERY, STORAGE, AND HANDLING

Materials shall be delivered, handled, and stored in accordance with the

manufacturer's recommendations. The storage area shall be as designated. The materials shall be stored in a dry, covered area until installed.

1.4 INSPECTION

Site furnishings shall be inspected upon arrival at the job site for conformity to specifications and quality in accordance with paragraph MATERIALS. Unacceptable items shall be removed from the job site.

PART 2 PRODUCTS

2.1 MATERIALS

Materials shall be the standard products of a manufacturer regularly engaged in the manufacture of such products. The materials provided shall be of a type with proven satisfactory use for at least 2 years.

2.1.1 Metal

Metallic materials and products shall conform to Section 05500 MISCELLANEOUS METAL. Metal components shall be furnished with factory drilled holes. Components shall be free of excess weld and spatter. Metal components with holes that will not be filled by hardware or hidden by other components will be rejected.

2.1.1.1 Steel

Structural steel products shall conform to ASTM A 36/A 36M, ASTM A 500 and ASTM A 501.

2.1.2 Recycled Material

2.1.2.1 General Requirements

Recycled materials shall contain a minimum 85 percent recycled post-consumer product and shall conform to EPA requirements in accordance with Section 01670 RECYCLED / RECOVERED MATERIALS. Recycled materials shall be constructed or manufactured with a maximum 1/4 inch deflection or creep in any member in conformance with ASTM D 648 and ASTM D 2990.

2.1.2.2 Structural Component

Recycled materials to include plastic lumber will not be used as structural components of site furnishings.

2.2 HARDWARE

Hardware shall be galvanized steel in accordance with ASTM A 153/A 153M and compatible with the material to which applied. All exposed hardware shall be burgandy and shall match in color and finish. Mounting hardware shall be concealed, recessed, and plugged.

2.3 ANCHORS

Anchors shall be provided, where necessary, for fastening site furnishings securely in place and in accordance with approved manufacturer's instructions. Anchoring devices that may be used, when no anchors are otherwise specified or indicated, include anchor bolts, slotted inserts, expansion shields for concrete footings and machine carriage bolts for

steel.

Provide concrete footings at all benches and trash receptacles so that supports shall have a minimum of 6" embed and footing depth of 36" minimum.

2.4 FINISH

Finish shall be burgandy for all exposed surfaces. Exposed surfaces and edges shall be rounded and polished. Finish shall be non-toxic, non-glare, and resistant to corrosion. Exposed surfaces shall be smooth and free of burrs or similar irregularities.

2.4.1 Coatings

2.4.1.1 Galvanizing

Galvanized components shall be hot-dipped in zinc after fabrication in accordance with ASTM A 123/A 123M. Tailings and sharp protrusions formed as a result of the hot-dip process shall be removed and exposed edges burnished.

2.4.1.2 Polyester Powder

Powder-coated surfaces shall receive electrostatic zinc coating prior to painting. Powder coating shall be electrostatically applied and oven cured. Polyester powder coating shall be resistant to ultraviolet (UV) light.

2.4.2 Color

Color of site furnishing components shall be burgandy.

2.5 SITE FURNISHING STANDARDS

Site furnishings shall be furnished with the dimensions and requirements indicated.

2.5.1 Benches

Benches shall be furnished with no sharp edges or protruding hardware.

Benches shall have curved edge, and curved seat/backrest intersection.

Benches shall be constructed of single curved tubular 4" support.

Benches shall be 6'-0" long.

Benches shall be constructed of perforated metal.

Benches shall be burgandy.

2.5.1.1 Height of Benches

The height above finished grade or specified surface shall be between 18-20 inches and level.

2.5.1.2 Seat

The seat surface shall be pitched or slotted to shed water; the seat depth

shall be between 12-18 inches and pitched down at the back at a 0-5 degree angle. Seat shall have a minimum width of 24 inches per person, and shall overhang the support base by a minimum of 4 inches for heel space and to facilitate rising from a seating position.

2.5.1.3 Back Rest

The height shall be between 15-18 inches from the top of the seat and the connection shall be at a 90-110 degree angle to the seat.

2.5.1.4 Weight Limit

Seats shall support a minimum 300 lbs for each person they are designed to accommodate.

2.5.2 Trash and Litter Receptacles

Trash and litter receptacles shall be furnished with weather protection, odor containment, and insect/animal-proofing. Container size shall be 18 gauge.

Trash and litter receptacles shall be constructed of single curved tubular 4" support.

Trash and litter receptacles shall have an 18 gallon capacity.

Trash and litter receptacles shall be constructed of perforated metal with single steel support post at center of receptacle.

Center support of the trash and litter receptacles shall have a six (6) inch embed into concrete footing. Concrete footing shall be 36" below the bedroom wested.

Trash and litter receptacles shall be burgandy.

2.5.2.1 Height

Trash and litter deposit openings shall be between 30-40 inches above the ground.

2.5.2.2 Liners

Trash and litter receptacles shall be furnished with disposable inner-linings. Self-dumping type designs to include hinged bottom, top or sides will be rejected.

2.5.2.3 Anchors

Trash and litter receptacles that can be anchored to resist overturning by typical use, high winds, or animals shall be furnished and anchored in accordance with the manufacturer's recommendations.

2.5.2.4 Openings

Openings for trash and litter insertion shall be a minimum of 4 inches in diameter. Edges of the openings shall be crimped, rounded and smoothed.

PART 3 EXECUTION

3.1 INSTALLATION

The Contractor shall verify that finished grades and other operations affecting mounting surfaces have been completed prior to the installation of site furnishings. Site furnishings shall be installed plumb and true in accordance with the approved manufacturer's instructions.

3.1.1 Child Accessibility

Child accessibility requirements are to be met. Child anthropometric dimensions must be used and not adult anthropometric dimensions.

3.1.2 Application of Field Finishes

Where indicated, field finishes shall be applied in accordance with Section 09900 PAINTING, GENERAL.

3.1.3 Parts

New parts shall be acquired from the manufacturer. Substitute parts will not be accepted unless approved by the manufacturer.

3.1.4 Assembly

When the inspection of parts has been completed, the site furnishings shall be assembled and anchored according to manufacturer's instructions or as indicated. When site furnishings are assembled at the site, assembly shall not interfere with other operations or pedestrian and vehicular circulation.

3.1.5 Testing

Each site furnishing shall be tested to determine a secure and correct installation. A correct installation shall be according to the manufacturer's recommendations and by the following procedure: The Contractor shall measure the physical dimensions and clearance of each installed site furnishing for compliance with manufacturer's recommendations and as indicated. Site furnishings which do not comply shall be reinstalled. Fasteners and anchors determined to be non-compliant shall be replaced. A written report describing the results of the testing shall be provided.

3.2 RESTORATION AND CLEAN UP

When the installation has been completed, the Contractor shall clean up and protect the site. Existing areas that have been damaged from the installation operation shall be restored to original condition at Contractor's expense.

3.2.1 Clean Up

The site shall be cleaned of all materials associated with the installation. Site furnishing surfaces shall be cleaned of dirt, stains, filings, and other blemishes occurring from shipment and installation. Cleaning methods and agents shall be according to manufacturer's instructions or as indicated.

3.2.2 Protection

The area shall be protected as required or directed by providing barricades and signage. Signage shall be in accordance with Section 10430 EXTERIOR SIGNAGE.

3.2.3 Disposal of Materials

Excess and waste material shall be removed and disposed off Government property .

3.3 RE-INSTALLATION

Where re-installation is required, the following shall be accomplished:

- a. Re-install the product as specified. Material acquisition of replacement parts is the responsibility of the Contractor. Provide replacement materials that are new and supplied by the original manufacturer to match.
- b. Damage caused by the failed installation shall be repaired.

-- End of Section --

SECTION 02882

PLAYGROUND EQUIPMENT
06/01

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 123/A 123M	(2000) Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A 135	(1997c) Electric-Resistance-Welded Steel Pipe
ASTM A 153/A 153M	(2000) Zinc Coating (Hot-Dip) on Iron and Steel Hardware
ASTM A 500	(1999) Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
ASTM A 513	(2000) Electric-Resistance-Welded Carbon and Alloy Steel Mechanical Tubing
ASTM B 26/B 26M	(1999) Aluminum Alloy Sand Castings
ASTM B 108	(1999) Aluminum-Alloy Permanent Mold Castings
ASTM B 117	(1997) Operating Salt Spray (Fog) Apparatus
ASTM B 179	(1996) Aluminum Alloys in Ingot and Molten Forms for Castings from All Casting Processes
ASTM B 221	(2000) Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes
ASTM B 221M	(2000) Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric)
ASTM D 648	(2000) Deflection Temperature of Plastics Under Flexural Load
ASTM D 822	(1996) Conducting Tests on Paint and Related Coatings and Materials Using Filtered Open-Flame Carbon-Arc Exposure

Apparatus

ASTM D 1248	(2000) Polyethylene Plastics Molding and Extrusion Materials
ASTM D 1735	(1999) Testing Water Resistance of Coatings Using Water Fog Apparatus
ASTM D 2454	(1995) Determining the Effect of Overbaking on Organic Coatings
ASTM D 2794	(1993; R 1999e1) Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)
ASTM D 3359	(1997) Measuring Adhesion by Tape Test
ASTM D 3363	(2000) Film Hardness by Pencil Test
ASTM D 6112	(1997) Compressive and Flexural Creep and Creep-Rupture of Plastic Lumber and Shapes
ASTM F 1487	(1998) Standard Consumer Safety Performance Specification for Playground Equipment for Public Use

CONSUMER PRODUCT SAFETY COMMISSION (CPSC)

CPSC Pub No 325	(1994) Handbook for Public Playground Safety
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1.2 DEFINITIONS

Age-Appropriate: A term that describes equipment scale to include platform height, fall height and maximum equipment height, that allows safe and successful use by children of a specific chronological age; mental and physical ability; and anthropometric measurement. Maximum equipment height and complexity will not exceed a child's ability in that age group.

Composite Structure: Also "Composite Play Structure; Linked Structure". Two or more play events attached, directly adjacent or functionally linked, to create one integral unit that provides more than one play activity.

Designated Play Surface: Any elevated surface for standing, walking, sitting, or climbing; or a flat surface a minimum 2 inches wide having up to a maximum 30 degree angle from horizontal. In some play events the platform surface will be the same as the designated play surface. However, the terms should not be interchanged as they do not define the same point of measurement per ASTM F 1487.

Maximum Equipment Height: The highest point on the equipment (i.e., roof ridge, top of support pole).

Play Event: A piece of manufactured playground equipment that supports one or more play activities.

Protective Surfacing: Material to be used within the use zone that meets the fall attenuation requirements of Section 02791 PLAYGROUND PROTECTIVE SURFACING.

Suspended Hazard: Cable, wire, rope or similar devices suspended up to a maximum 7 feet high between play events; or installed up to a maximum 45 degree angle from the ground to the play event.

Tot: A child under 4 years of age in the pre-toddler and toddler age group.

1.3 CHILD SAFETY AND ACCESSIBILITY STANDARDS

1.3.1 Child Safety

Play events shall meet the child safety performance requirements described in CPSC Pub No 325 and ASTM F 1487. The requirements include the following: Head and neck entrapment; sharp points, edges, and protrusions; entanglement; pinch, crush, and shear points; suspended hazards; play event access and egress points; play event use zone perimeter; and design criteria. Since ASTM F 1487 criteria is defined for the minimum user through the maximum user (2 through 12 years of age), the requirements for the infant or pre-toddler age group are not prescribed. This specification and Section 02791 PLAYGROUND PROTECTIVE SURFACING establish the requirements for the infant and pre-toddler age groups.

1.3.2 Child Accessibility

The accessibility requirement in accordance with ASTM F 1487 includes the following: When the play event use zone consists of a protective surfacing rated as unaccessible, at least one accessible route shall be provided from the use zone perimeter to the play event. When there is more than one of the same play activity provided, only one shall meet accessibility requirements (i.e., one swing seat or one spring rocking play event). When the access and egress points are not the same for a play event, an accessible route shall be provided to both. The accessible route shall access all accessible play events and elements. The protective surfacing performance requirements shall be in accordance with Section 02791 PLAYGROUND PROTECTIVE SURFACING.

1.4 SUBMITTALS

Provide a plan view of the play equipment including use zones as recommended by the manufacturer located within the given play area edging dimensions.

Shop drawing submittals will include detail drawings of each component in a composite play structure complete with instructions for assembly and a list of parts.

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Configuration

Scale drawings defining the revised play event configuration.

Shop Drawings

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Scale drawings defining the revised use zone perimeters and play event layout.

Fall Height

Scale drawings defining the revised depth or type of protective surfacing.

Finished Grade and Underground Utilities

Finished grade, underground utilities, storm-drainage system and irrigation system status; and location of underground utilities and facilities.

SD-03 Product Data

Equipment

Manufacturer's descriptive data; catalog cuts; references; and the latest edition of ASTM F 1487 and CPSC Pub No 325. Manufacturer's specifications, handling and storage requirements, installation procedures, and safety data sheets to include the following: bare or painted metal platform and slide bed orientation from the direct sun; warnings; and child safety performance standards.

Equipment Identification

A list to include part numbers of furnished play event and equipment materials and components.

Delivery, Storage and Handling

Delivery schedule and manufacturer's name.

Manufacturer Qualification

Name of the owner or user; service or preventive maintenance provider; date of the installation; point of contact and telephone number; and address for 10 sites.

Spare Parts

Furnish manufacturer supplied spare parts.

Materials

Assembled play event structural integrity tests; vertical load tests; and the maximum number of users that can be on the play event.

SD-04 Samples

Color

Two color charts displaying the colors and finishes.

SD-06 Test Reports

Recycled Plastic

Individual component and assembled unit structural integrity test; creep tolerance; deflection tolerance; and vertical load test results. The estimated percentage of recovered material content in the material and components. Life-cycle durability.

SD-07 Certificates

Materials

Prior to the delivery of materials, certificates of compliance attesting that materials meet the specified requirements. Certified copies of the material certificates shall include composition and tests to which the material has been subjected.

Manufacturer Qualification

Certificate of Insurance AA rated for a minimum one million dollars.

Installer Qualification

The installer's company name and address, and training and experience certification.

Manufacturer's Representative

The individual's name, company name and address, and playground safety training certificate.

Substitution

Technical representative's written approval.

Play Event Modification

Manufacturer's written approval.

Child Safety and Accessibility Evaluation

Record of measurements and findings by the certified playground safety inspector. Verification the installed play events and equipment meet manufacturer's recommendations and paragraph CHILD SAFETY AND ACCESSIBILITY STANDARDS.

SD-10 Operation and Maintenance Data

Maintenance Instruction

Two bound copies of the manufacturer's operation and maintenance manuals.

1.5 DELIVERY, STORAGE, AND HANDLING

A delivery schedule shall be provided at least 10 calendar days prior to

the first day of delivery. Equipment shall be delivered, handled, and stored in accordance with the manufacturer's recommendations. The storage area shall be as designated. The materials shall be stored in a dry, covered area until installed.

1.6 EQUIPMENT IDENTIFICATION

Playground equipment shall be identified with attached and durable label stating the age-group that the equipment is designed to accommodate. There shall be permanent WARNING labels and manufacturer's identification labels, ASTM F 1487.

1.7 INSPECTION

Playground equipment shall be inspected upon arrival at the job site for meeting age-appropriate requirements for the age-group that the equipment is designated to accommodate and specified quality in accordance with paragraphs MATERIALS and CONFIGURATION. Prohibited or unacceptable equipment shall be removed from the job site.

Provide proof of IPEMA Certification (International Play Equipment Manufacturers Association) that the individual play components have been tested and are found to be in conformance with ASTM F 1487-98.

Provide letter from the manufacturer that the custom layout of the composite play structures are in conformance with ASTM F 1487-98 and meet current accessibility guidelines.

Provide inspection and letter from representative of the manufacturer documenting that play equipment was installed according to manufacturers recommendations.

1.8 PROHIBITED EQUIPMENT

Equipment that is prohibited on play areas include the following: chain balance beams; rotating equipment, such as merry-go-rounds, log rolls, whirls and may poles; fulcrum seesaws (teeter totters); spring rocking equipment intended for standing; animal figure swings; rope swings; multiple occupancy swings; swinging exercise and trapeze bars; swinging platforms; tire climbers; swinging dual exercise rings; roller slides; trampolines; swinging gates or doors; and new or used vehicle tires. Play houses or enclosures made of horizontal posts or bars with space between them. Wood components treated with creosote, pentachlorophenol, and tributyl tin oxide. Wood components coated with a finish containing pesticide.

1.9 AGE GROUPS

Play areas are designed to provide challenging play activities by age group. Playground equipment shall be designed to be age appropriate for the age group designated to use it. The age groups are defined as follows:

1.9.1 Playground Areas)

The age groups accommodated at these areas range from 3 years through 12 years of age defined as the following: pre-school age group (3 through 5 years of age); school-age age group (5 through 9 years of age); and pre-teen age group (9 through 12 years of age). A multi-age playground

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consists of the following age groups: pre-school age and school-age groups.

1.10 MANUFACTURER QUALIFICATION

Play events and equipment similar to those furnished shall have been installed in a minimum 10 sites and been in successful service for a minimum 5 year calendar period. The manufacturer shall provide a Certificate of Insurance AA rated for a minimum one million dollars covering both product and general liability.

1.11 INSTALLER QUALIFICATION

The installer shall be certified by the manufacturer for training and experience installing the play events and equipment.

1.12 WARRANTY

Provide a lifetime warranty on aluminum components, recycled plastic support posts and recycled decks. This warranty does not include cosmetic issues.

Provide a minimum 15 year warranty on all pipes, rails, and rungs. This warranty does not include cosmetic issues.

Provide a minimum 10 year warranty on all clamps, connecting brackets and hardware, and plastic components. This warranty does not include cosmetic issues.

Provide a minimum 1 year warranty on all moving parts (spring assemblies for all rocking equipment) and any other equipment not included above against failure due to corrosion, deterioration or workmanship.

1.13 TECHNICAL REPRESENTATIVE

1.13.1 Playground Areas

The technical representative for play areas shall be the Contracting Officer or designated representative. The design of these outdoor play areas shall be based on the play program and the age groups to be accommodated.

1.14 MANUFACTURER'S REPRESENTATIVE

The manufacturer's certified playground safety inspector or the manufacturer's designated certified playground safety representative shall supervise the installation and adjustment of the play events and equipment to verify the installation meets the requirements of the manufacturer, this specification, and paragraph CHILD SAFETY AND ACCESSIBILITY STANDARDS.

PART 2 PRODUCTS

2.1 General

Composite playstructures are to be according to layout shown on the Drawings and specified herein. Decks are to be designed to support the number of simultaneous users as defined in ASTM f1487-98, article 12.4 All posts shall have a "finish grade marker" positioned on the post identifying the bury line as recommended by the manufacturer for the correct installation and the top of the resilient surfacing. All caps are to be

factory installed with self sealing rivet.

At Play Area G15, provide three (3) free standing panels between the four columns 1/B; 1/B.3; 2/B and 2/B.3. Panels shall be configured in a large "Z" shape. Panels shall have the following features: A) Clock Panel; B) Tic Tac Toe Panel; and C) Driver Panel with windshield opening. The Tic Tac Toe Panel shall be located in the middle and shall be yellow with rotating X's and O's. The other panels shall be tan with red accents and lettering. Panels shall be made of high-density polyethylene.

At Play Area G15, provide four (4) individual spring rides in the area between columns 1/B; 2B; from column line B to the south wall of the Play Area G15. Each spring ride shall have one rubber spring. The four (4) individual spring rides shall have animal shapes: dog, cat, pony, and duck.

At Play Area G15, provide play structure in configuration shown, that includes stairs, loop arch climber, 3' high deck, sliding pole (yellow), "L" tube slide (yellow) and contemporary arch roof (tan). Play structure shall weigh 1,000 pounds. Play structure shall be able to accommodate 8-10 children, minimum. Play structure shall weigh a maximum of 1,000 pounds.

At Play Area 108, provide "skyscraper" type tower styled play structure in configuration shown. Play structure shall consist of an accessible transition platform (brown), see-thru crawl tube (tan), stairs, pipe wall with wheel (tan), 48 " high deck (tan) attached to a double wide slide (white) and a half moon climber (tan), 36" high deck (tan) attached to an extra wide slide (white) and a loop arch climber (tan). Both decks shall be covered with "pagoda" styled roofs (red). Play structure shall be 15' x 42' in a Minimum Use Zone of 29' x 36', and shall be able to accommodate 18-24 children, minimum. Structure shall weigh a maximum of 2,750 pounds

At Play Area 108, provide dinosaur theme "salamander" styled preschool level free standing play climber where shown. Climber shall be designed to help teach balance and climbing skills. Climber shall be built close to the ground, accessible to preschool age students. Climber shall have Climber shall be coated with a textured surface creating a "dinosaur skin" feel (green). Climber shall have a stylized single-plane steel insert "head" (green) with painted eyes and mouth. Climber shall be 5'-3" x 17' in a Minimum Use Zone of 17'-3" x 29', and shall be able to accommodate 6-8 children, minimum. Climber shall weigh a maximum of 200 pounds.

At Play Area 108, provide 3-Level Chinning Bar where shown. Chinning bar shall be galvanized with powder coating (Color: blue). Chinning bar shall be 3" x 12', with bars at heights of 54", 66" and 84". Minimum Use Zone is 12'-3" x 24'-3".

At Play Area 215, provide 3-Level Chinning Bar where shown. Chinning bar shall be galvanized with powder coating (Color: yellow). Chinning bar shall be 3" x 12', with bars at heights of 54", 66" and 84". Minimum Use Zone is 12'-3" x 24'-3".

At Play Area 310, provide ring climber where shown. Ring climber shall include two 2-3/8" upright legs; two 1-7/8" sliding poles and six 1-5/8" rings. Ring climber shall be fully galvanized. Ring climber shall be 6'-6" diameter x 10' high, maximum. Ring climber shall be colored red.

At Play Area 310, provide 8' high tetherball pole (including anchorage), ball and cord where shown. Tetherball pole shall be 2-3/8" galvanized steel posts. Tetherball pole shall be yellow.

At all play areas, anchor play structure and equipment securely to building structure. Provide additional material, fasteners, etc. beyond manufacturer's standard as necessary for complete anchorage because of unique location of each play structure.

2.2 MATERIALS

Materials shall be the standard products of a manufacturer regularly engaged in the manufacture of play event products.

Powder Coating: All Steel and aluminum parts shall be powder coated. All metal components shall be free of excess weld and spatter and shall be thoroughly cleaned, treated for corrosion resistance and thoroughly dried prior to powder-coating. Powder-coating shall be electro-statically applied to a minimum average .004" thickness.

Exposed climbing rungs and safety rails and handrail loops: 1.315 inch O.D. with .290 inch thick wall of aluminum or hot-dip galvanized steel. Pipe rungs shall not turn or twist. Rungs intended for climbing shall have a slip resistant finish such as a textured crosshatch pattern for sure grip. Exposed ends of pipe shall be plugged at the factory with round, high-density polyethylene plug to match pipe.

2.2.1 Metal

Metal components shall have factory-drilled holes and be corrosion resistant. The components shall be free of excess weld and spatter. Metallic materials shall conform to Section 05500 MISCELLANEOUS METAL. Components with extra holes not filled by hardware or covered by components shall be rejected.

2.2.1.1 Steel

Steel components shall comply with ASTM A 135, ASTM A 500, or ASTM A 513. Minimum tensile strength shall be 50,000 psi. Minimum yield point shall be 50,000 psi, unless otherwise noted.

2.2.1.2 Clamps

Clamps shall be fastened to the post using an aluminum drive rivet and stainless steel pin.

2.2.1.3 Hardware

When securing, the hardware shall require a tool to prevent unauthorized loosening and removal.

Fasteners shall be socketed and pinned tamper-proof in design, stainless steel per ASTM F 879. Manufacturer is to provide special tools for pinned hex fasteners. Double clevis and bolt links of drop forged carbon steel, heat treated and zinc plated are to be used in lieu of s-hooks.

2.2.1.4 Rails, Loops, and Hand bars

Rails, loops, and hand bars shall consist of corrosion resistant aluminum, powder-coated steel or galvanized steel. Polyvinyl chloride coating, if provided, shall be as specified.

2.2.1.5 Anchors

Anchors shall be in accordance with manufacturer's recommendations.

2.2.2 Components

2.2.2.1 Slides

Slides shall have a hood unless otherwise noted to force children to sit down before entering slide bedway.

Slides shall have an exit height of 11" maximum on slides no greater than 48" high. Slides shall have an exit height between 7 and 15" on slides greater than 48" high.

Slides shall be extra wide and tube slides. Slides shall be roto-molded from linear low density, U.V. stabilized, anti-static polyethylene, double wall construction.

Exit support shall be fabricated of 10 guage hot rolled steel with 1.66" O.D. x .090" wall galvanized steel tube. Sit down tube shall be 1.315" O.D. x .085" wall galvanized steel tube. Provide powder coating.

Tube slides shall be rotationally molded, U.V. stabilized anit-static polyethylene. 24" diameter x 1/4" nominal wall thickness. The entrance panel shall be vacuum formed U.V. stabilized polyethylene, 1/4" wall nominal. Tube sections shall be molded so all hardware connections are on the outside of the tube.

Curved slides shall be rotationally molded of linear medium density, U.V. stabilized, anti-static polyethylene with color molded in. Sit down tube shall be 1.315" O.D. x .085" wall galvanized steel tube.

Straight slides shall have 4" high rail

2.2.2.2 Decks

Decks shall be fabricated of 11 guage perforated hot rolled steel unitized deck frame.

Decks frame shall be PVC coated after fabrication: coating thickness of .080"; tensile strength of 2300 psi; tear strength 419 psi; ultimate elongation 250%; shore "A" durometer of 95-12, PVC coating containing ultraviolet stabilizers. Deck frame shall be brown

Decks planking shall be fabricated of 2" x10" recycled plastic mechanically fastened to the PVC coated deck frame.

Recycled plastic deck planks shall be weathered tan.

Due to possible unsupervised use after school hours, the following requirements are more conservative than the ASTM guidelines: Decks greater than 20" high and designed for 2-5 year-olds shall have protective barrier. Decks greater than 30" high and designed for 5-12 year-olds shall have a protective barrier. 'Guard rails' are not acceptable.

2.2.2.3 Protective Barrier

See paragraph 2.3.4.1 of this Section.

2.2.2.4 Recycled Plastic Posts

Posts at large play equipment at Play Area 108 shall be 5.0" O.D. recycled plastic with 1.9" O.D. galvanized inner core with molded in, round ball-cap. Color of all posts shall be blue.

Posts at small play equipment at Play Area G15 shall be 3.5" O.D. recycled plastic with 1.9" O.D. galvanized inner core with molded in, round ball-cap. Color of all posts shall be blue.

2.2.2.5 Panels

Plastic panels shall be molded of ultraviolet (UV) and color stabilized polyethylene or nylon with a minimum 3/16 inch thickness, ASTM F 1487. Edges shall be a minimum 3/16 inch radius.

2.2.2.6 Ladder

Ladder shall be fabricated of 1.315" O.D. galvanized steel tube. Ladders shall be powder coated.

2.2.2.7 Handrails

Handrails shall be fabricated from 1.315" O.D. steel tube frame with steel caps permanently attached to the end. Handrails shall have holes for assembly factory punched. Handrail assembly shall be powder coated.

2.2.2.8 Transfer Steps

Step assembly shall be a welded assembly fabricated from 11 gauge perforated hot rolled steel into a single unitized part.

Assembled step shall have a PVC coating with a nominal thickness of 187 mil wrap.

Assembled step shall have a tensile strength of 2300 psi, tear strength of 419 psi, ultimate elongation 250%, and shore "A" durometer of 95 +2.

Each step shall have a 14" tread depth, a 6" rise and shall be 30" wide.

2.2.2.9 Stairs

Stairs shall be assembled from 1/8" x 8" hot rolled steel sides, 2-1/4" x 7-1/2" sep assemblies and 1/8" x 10" kickplate.

Stairway shall be factory assembled.

Step assembly shall be a welded assembly fabricated from 11 gauge perforated hot rolled steel into a single unitized part.

Step assembly shall be PVC coated.

Handrail shall be fabricated of 1.66" O.D. x .090" wall galvanized pipe and powder coated.

2.2.2.10 Climber

Climber shall be fabricated of 1.9" O.D. galvanized steel tube with rungs that are 1.029" O.D. galvanized steel tube.

Climber shall be an all welded assembly with a powder coated finish.

2.2.2.11 Crawl Tubes

2.2.2.11.# "L" Shaped Crawl Tubes

"L" shaped crawl tubes shall be rotationally molded of linear low density polyethylene with built in ultraviolet light inhibitor. Polyethylene parts shall comply with ASTM-D-1248, type 2 and density per ASTM-D-1505.

Tube sections are 24" inside diameter and 48" long with flanged ends to connect.

Tube end panel shall be compression molded high density polyethylene that has been formulated from ultraviolet light stability and color retention.

Panels are 3/4" thick and meet density per ASTM-D-1505, tensile strength of 2400 psi per ASTM-D-636.

Brace shall be 1.66" O.D. galvanized steel tube.

View ports shall be fabricated from 1/4" clear polycarbonate.

2.2.2.11.# Straight Crawl Tubes

Straight crawl tubes shall be rotationally molded of linear low density polyethylene with built in ultraviolet light inhibitor. Polyethylene parts shall comply with ASTM-D-1248, type 2 and density per ASTM-D-1505.

Tube sections are 24" inside diameter and 48" long with flanged ends to connect.

Tube end panel shall be compression molded high density polyethylene that has been formulated from ultraviolet light stability and color retention.

Panels are 3/4" thick and meet density per ASTM-D-1505, tensile strength of 2400 psi per ASTM-D-636.

View ports shall be fabricated from 1/4" clear polycarbonate.

2.2.2.12 Roofs

Roofs shall be rotationally molded of linear low density polyethylene.

All material shall be ultraviolet stablized with the color molded in.

Nominal wall thickness shall be 0.1875".

Polyethylene shall comply with ASTM-D-1248; Density - ASTM-D-1505;
Brittleness - ASTM-D-746; and Flexural Modulus - ASTM-D-790.

2.2.3 Recycled Plastic

Recycled plastic shall contain a minimum 85 percent of recycled post-consumer product and shall conform to EPA requirements in accordance with Section 01670 RECYCLED / RECOVERED MATERIALS. Recycled material shall be constructed or manufactured with a maximum 1/4 inch deflection or creep in any member, ASTM D 648 and ASTM D 6112.

Recycled plastic shall be manufactured from post consumer recycled plastics primarily from high density polyethylene (HDPE)(2) and low density polyethylene (LDPE)(4), but formulations may include plastics from other Society of Plastics Industries (SPI) primary material groups.

Various additives necessary to obtain desired colors shall amount to 4% maximum of the finished product.

Recycled Plastic shall have the following physical properties:

Density	.917 to 980 g/cc per ASTM-D-792
Compressive strength	3200-3800 lbs/in
Tensile strength:	1470-1700 psi
Flexural modulus:	1.6 x 10 psi
Hardnes (shore D)	65 shore D
Izod impact:	2.8 (ft/lb/sq in)
Coefficient of thermal expansion:	70 x 10.6 (in/in F)
Screw withdrawal:	140 lbs (6 Penny Common Bright)
Electrical properties:	10**15(ohm-cm)per ASTM-D257
Water absorption:	.01% 24 hours per ASTM-D-570
Expansion/contraction:	.0007 (in/in/F) per ASTM-D-696

2.2.3.1 High Density Polyethylene

The components shall be molded of ultraviolet (UV) and color stabilized polyethylene. The material shall consist of a minimum 75% plastic profile of high-density polyethylene, low-density polyethylene, and polypropylene raw material. The material shall be non-toxic and have no discernible contaminates such as paper, foil, or wood. The material shall contain a maximum 3 percent air voids. The material shall be free of splinters, chips, peels, buckling, and cracks. Material shall be resistant to deformation from solar heat gain. Material shall have factory-drilled holes. Components with extra holes not filled by hardware or covered by other components shall be rejected. The material shall not be painted.

2.2.3.2 Panel

Panels shall be a minimum 1/4 inch thick; exposed edges shall be smoothed, rounded, and free of burrs and points; and the material shall be shatterproof and resistant to fading, cracking, or fogging.

2.2.3.3 Structural Component

Recycled plastic materials will not be used as load bearing structural members.

2.2.3.4 Recycled Plastic Molded As Lumber

For deck or platform construction, the span of the structural support members shall be a maximum 12 inches on center and recycled plastic decking shall connect to a minimum three joists. Material used for decking shall have a non-slip texture surface. The assembly shall deflect a maximum 1/360 of the span of the frame when exposed to a uniform live load of 40 lbs/ft, ASTM D 648. The product shall meet the structural integrity test requirements, ASTM F 1487 and ASTM D 6112.

2.2.4 Coatings

2.2.4.1 Galvanized

Metal components shall be hot-dipped in zinc after fabrication according to ASTM A 123/A 123M. Tailings and sharp protrusions formed as a result of the hot-dip process shall be removed and edges shall be burnished.

2.2.4.2 Polyester Powder

Powder-coated surfaces shall receive electrostatic zinc coating prior to painting. Powder coating shall be electrostatically applied and shall be oven cured. Polyester powder shall be in accordance with the following: ASTM D 3359 for adhesion; ASTM D 1735 for flexibility; ASTM D 3363 for hardness; ASTM D 2794 for impact; ASTM D 2454 for overbake resistance; ASTM B 117 for salt spray resistance; and ASTM D 822 for weatherability.

2.2.4.3 Polyvinyl Chloride (PVC)

PVC coating shall be primed with a clear acrylic thermosetting solution. The primed parts shall be preheated prior to dipping. The liquid polyvinyl chloride shall be UV stabilized and mold-resistant. The coated parts shall be cured. The coating shall be a minimum 0.08 inch thick within a plus or minus 0.020 inch tolerance. The coating shall have an 85 durometer hardness, ASTM D 3363. The finish shall be slip-resistant.

2.2.4.4 Cast-In Place Concrete

Cast-in-place concrete material shall conform to Section 03330 CAST-IN-PLACE ARCHITECTURAL CONCRETE.

2.2.5 [Enter Appropriate Subpart Title Here]2.2.5.1 Sealants

Sealants shall seal all applied surfaces from air. Sealants containing pesticide are prohibited.

2.2.6 Color

Color shall be provided as indicated in herein and in the Color Schedule.

2.3 EQUIPMENT

2.3.1 Configuration

Play event configuration, platform height, fall height, and maximum equipment height shall be as indicated. When the configuration varies from the play event indicated, shop drawings defining the configuration shall be provided to include the following: equipment layout with the use zone perimeter; designated play surface spot elevations; maximum equipment height spot elevations; platform spot elevations; protective barriers; guardrails; bare or painted metal platform and slide bed orientation; and play events in relationship to the playground layout.

2.3.2 Substitution

Substitutions will not be allowed and play events will not be selected without written approval from the technical representative. Manufacturer substitutions which increase the play event platform height or maximum equipment height shall be evaluated. The increased height requires additional protective surfacing in accordance with paragraph FALL HEIGHT.

2.3.3 Platform Height

Platform height is used to define the age group for age appropriate play events and composite structures. To be age appropriate, the platform height shall meet the finished elevations of the age groups in the following paragraphs. For some play events platform height and paragraph FALL HEIGHT are the same.

See Paragraph 2.1, this section for noted heights.

2.3.3.1 Pre-School Age Group

Platforms designed for children 3 through 5 years of age shall have a finished elevation a maximum 48 inches above the finished elevation of the protective surfacing.

2.3.3.2 School-Age Age Group

Platforms designed for children 5 through 8 years of age shall have a finished elevation a maximum 72 inches above the finished elevation of the protective surfacing.

2.3.3.3 Pre-Teen Age Group

Platforms designed for children 8 through 12 years of age shall have a finished elevation a maximum 72 inches above the finished elevation of the protective surfacing.

2.3.4 Protective Barrier and Guardrail

Protective barriers and guardrails shall be provided in accordance with paragraph CHILD SAFETY AND ACCESSIBILITY STANDARDS.

2.3.4.1 Protective Barrier

A protective barrier is defined as an enclosing device around an elevated surface that prevents both inadvertent and deliberate attempts to pass through the device. The protective barrier for pre-school age groups shall

be provided on elevated surfaces a minimum 30 inches above the protective surfacing. The protective barrier for school-age and pre-teen age groups shall be provided on elevated surfaces a minimum 38 inches above the protective surfacing. The protective barrier shall completely surround the elevated surface except for the access or egress route.

A protective barrier shall have no opening greater than 3-1/2" and shall consist of vertical bars or designed to discourage climbing.

2.3.4.2 Guardrail

A guardrail is defined as a device around an elevated surface that prevents inadvertent falls from the elevated surface. The guardrail for pre-school age groups shall be provided on elevated surfaces a minimum 20 inches above the protective surfacing. The guardrail for school-age and pre-teen age groups shall be provided on elevated surfaces a minimum 30 inches above the protective surfacing. The guardrail shall completely surround the elevated surface except for the access or egress route.

2.3.5 Spring Rocking Equipment

Spring mechanisms shall conform to the requirements for pinch, crush, and shear points for a maximum 120 lb weight limit in accordance with ASTM F 1487. Seats shall be designed to accommodate single users.

2.3.6 Roofs

Roofs shall contain no designated play surface.

2.3.7 Sliding Poles

Sliding poles shall be a maximum 1.9 inch diameter and a continuous surface with no protruding welds or joints along the sliding area.

2.3.8 Plastic Slide

The slide shall be molded of UV stabilized polyethylene or nylon with minimum of 3/16 inch wall thickness. The edge shall be a minimum 3/16 inch radius, ASTM D 1248, Type II, Class A, Grade G4.

PART 3 EXECUTION

3.1 SITE PREPARATION

3.1.1 Finished Elevation and Underslab Utilities

The Contractor shall verify that finished elevations are as indicated; installation of the underslab utilities through the area has been completed; installation of the storm-drainage system through the area has been completed. The location of underslab utilities in the area of the operation shall be verified. Damage to underslab utilities and facilities shall be repaired at the Contractor's expense.

3.1.2 Layout

The layout of the entire outdoor play area shall be marked before work begins to include the following: all play event configuration access and egress points; use zone perimeters. Sufficient space shall be provided between all adjacent play events and individual play events for play

activities and circulation. Moving and rotating play events shall be located away from circulation to prevent collisions.

3.1.2.1 Use Zone

The use zone is defined as the area beneath and immediately adjacent to a play structure or equipment that is designated for unrestricted circulation around equipment; and on whose surface it is predicted that a user would land when falling from or exiting the equipment, (paragraph CHILD SAFETY AND ACCESSIBILITY STANDARDS). Also, the use zone is associated with the following terms; "Clear Area," and "Fall Zone". The use zone shall be free of hard surfaces, objects or obstacles that a child could run into or fall on top of and be injured. The use zone shall consist of protective surfacing in accordance with the requirements of Section 02791 PLAYGROUND PROTECTIVE SURFACING. The use zone perimeter shall meet or exceed the requirements of paragraph CHILD SAFETY AND ACCESSIBILITY STANDARDS. Use zone perimeters shall not overlap except for certain play events as defined in ASTM F 1487.

3.1.2.2 Shop Drawings

When the use zone perimeter and play event configuration conflict with the requirements and paragraph CHILD SAFETY AND ACCESSIBILITY STANDARDS, shop drawings defining corrective measures shall be submitted to include the following: Adjustment to the play event with the use zone perimeter; use zone perimeter overlaps; and structures.

3.1.3 Orientation

Bare or painted metal platforms and slide beds shall be oriented from the direct sun; or shaded to reduce contact burn risk. Play events that require orientation to adjacent play events or to meet visibility requirements shall be properly oriented.

3.1.4 Obstructions Below Slab

When obstructions below slab affect the work, shop drawings showing proposed adjustments shall be submitted for approval.

3.2 INSTALLATION

Play events shall be installed according to the manufacturer's recommendations and as shown to meet the requirements of paragraph CHILD SAFETY AND ACCESSIBILITY STANDARDS.

3.2.1 Play Event Modification

Field modifications of play events affect the coverage provided in paragraph WARRANTY; therefore, play events and equipment shall not be modified without the written approval of the manufacturer.

3.2.2 Plastic Play Events

Plastic and recycled plastic components shall be connected by stainless steel hardware. The hardware shall be countersunk. Recycled plastic molded as lumber or wood-polymer lumber shall be installed in accordance with the manufacturer's recommendations.

3.2.3 Supports

The top elevation of play event supports will be installed at the subbase of the protective surfacing.

3.2.4 Slide

The required exit region clear area shall be provided in accordance with ASTM F 1487.

3.2.5 Climber

A climber and similar components shall be installed in the vertical position. Angled or arch positions are not accepted.

3.2.6 Composite Structure

The composite structure use zone perimeter shall be composed of the use zone perimeters of the play events that, when joined together, comprise the composite structure.

3.2.7 Fall Height

3.2.7.1 General

The fall height is defined as the vertical distance between the finished elevation of the designated play surface and the finished elevation of the protective surfacing beneath it. For some play events the fall height and paragraph PLATFORM HEIGHT are the same. For some play events the fall height and maximum equipment height are the same. When the furnished play event fall height varies from the play event shown, shop drawings defining the revised depth or type of protective surfacing to meet or exceed the requirements of Section 02791 PLAYGROUND PROTECTIVE SURFACING shall be provided.

3.2.7.2 Measuring Fall Height

EQUIPMENT	MEASURING FALL HEIGHT
Composite Structure:	For a platform surrounded by protective barriers, measure from the platform finished elevation. For a platform surrounded by guardrails, measure from the guardrail top elevation.
Spring Rocking Equipment:	Measure from the seat top elevation.
Stationary Equipment, Climbable:	Measure from the maximum equipment height finished elevation.
Stationary Equipment, Nonclimbable:	Measure from the designated play surface finished elevation.

3.2.8 SIGNAGE

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For playground areas durable permanent signage shall be provided to identify the age group the equipment is designed to accommodate. Signage shall be in accordance with Section 10440 INTERIOR SIGNAGE.

Provide a minimum of one sign for every soft surface play structure/equipment set (total 9).

3.3 RESTORATION AND CLEAN UP

When the operation has been completed, the Contractor shall clean up and protect the Play Areas. Existing areas that have been damaged from the operation shall be restored to original condition at the Contractor's expense.

3.3.1 Clean Up

The Play Areas and play events shall be cleaned of all materials associated with the operation. Play events and surfaces shall be cleaned of dirt, stains, filings, and other blemishes occurring from shipment and installation. Cleaning methods and agents shall be as recommended by the manufacturer. Required labeling shall be undamaged and visible in accordance with paragraph EQUIPMENT IDENTIFICATION.

3.3.2 Protection

The area shall be protected as required or directed by providing barricades and signage. Signage shall be in accordance with Section 10430 EXTERIOR SIGNAGE.

3.3.3 Disposal of Materials

Excess and waste material shall be removed and disposed off site.

3.4 PLAYGROUND ACCEPTANCE

3.4.1 Child Safety and Accessibility Evaluation

When the protective surfacing is installed the play events and protective surfacing shall be thoroughly inspected and measured to verify the playground meets manufacturer's recommendations, paragraph CHILD SAFETY AND ACCESSIBILITY STANDARDS, and paragraph FALL HEIGHT. The play events shall be age appropriate for the age group using them in accordance with paragraph PLATFORM HEIGHT. Determine 1) secure anchoring; 2) all hardware and connectors are tight; 3) all hardware and connectors require tools to loosen; 4) all hooks are closed; 5) head and neck entrapment; 6) sharp points, edges, and protrusions; 7) entanglement; 8) pinch, crush, and shear points; 9) suspended hazards; 10) all component holes are filled; and 11) recycled plastic components used as load bearing structural members. Use zone distances shall be measured to determine the area is free of hard surfaces, objects or obstacles. Determine exceptions to use zone overlaps occur in accordance with paragraph USE ZONE. Play event fall height shall be measured and compared to critical height value for thickness of installed protective surfacing. The slide exit region shall have the required clear zone. Play events and surfaces shall be properly oriented. Climbers or similar components shall be installed in a vertical position. Warning labels and manufacturer identification labels shall be visible in accordance with paragraph EQUIPMENT IDENTIFICATION. Play events that do not comply shall be reinstalled. Fasteners, anchors, hardware and labels

that do not comply shall be replaced. Ensure positive drainage for the area and the lowest elevation of protective surfacing subgrade has been provided. A written report describing the results of the evaluation shall be provided.

3.4.2 Spare Parts

Play event and equipment spare parts provided by the manufacturer shall be furnished.

3.4.3 Maintenance Instruction

The manufacturer's operation and maintenance manual describing the recommended preventive maintenance, inspection frequency and techniques, periodic adjustments, lubricants, and cleaning requirements shall be furnished.

3.5 RE-INSTALLATION

When re-installation is required, accomplish the following: Re-install the product as specified. Provide new replacement materials supplied by the manufacturer. Material acquisition of replacement parts is the responsibility of the Contractor. Damage caused by the failed installation shall be repaired at the Contractor's expense.

-- End of Section --

SECTION 06650

SOLID POLYMER (SOLID SURFACING) FABRICATIONS
10/00

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI A136.1	(1992) Organic Adhesives for Installation of Ceramic Tile
ANSI Z124.3	(1995) Plastic Lavatories
ANSI Z124.6	(1997) Plastic Sinks

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 570	(1998) Water Absorption of Plastics
ASTM D 638	(1999) Tensile Properties of Plastics
ASTM D 638M	(1998) Tensile Properties of Plastics (Metric)
ASTM D 696	(1998) Coefficient of Linear Thermal Expansion of Plastics Between Minus 30 degrees C and 30 degrees C
ASTM D 2583	(1995) Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor
ASTM E 84	(1999) Surface Burning Characteristics of Building Materials
ASTM G 21	(1996) Determining Resistance of Synthetic Polymeric Materials to Fungi
ASTM G 22	(1976; R 1996) Determining Resistance of Plastics to Bacteria

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA LD 3	(1995) High Pressure Decorative Laminates
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1.2 GENERAL DESCRIPTION

Work in this section includes toilet partitions and as described in this specification and in Spec Section 10165 "Plastic Laminate Toilet Compartments".

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Shop Drawings
Installation

Shop Drawings indicating locations, dimensions, component sizes, fabrication and joint details, attachment provisions, installation details, and coordination requirements with adjacent work.

SD-03 Product Data

Solid polymer material
Qualifications
Fabrications

Product data indicating product description, fabrication information, and compliance with specified performance requirements for solid polymer, joint adhesive, sealants, and heat reflective tape. Both the manufacturer of materials and the fabricator shall submit a detailed description of operations and processes in place that support efficient use of natural resources, energy efficiency, emissions of ozone depleting chemicals, management of water and operational waste, indoor environmental quality, and other production techniques supporting sustainable design and products.

SD-04 Samples

Material; G/AE

A minimum 4 by 4 inch sample of each color and pattern for approval. Samples shall indicate full range of color and pattern variation. Approved samples shall be retained as a standard for this work.

Countertops; G/AE

A minimum 1 foot wide by 6 inch deep, full size sample for each type of counter top shown on the project drawings. The sample shall include the edge profile and backsplash as detailed on the project drawings. Solid polymer material shall be of a pattern and color as indicated on the drawings. Sample shall include at least one seam. Approved sample shall be retained as standard for this work.

SD-06 Test Reports

Solid polymer material

Test report results from an independent testing laboratory

attesting that the submitted solid polymer material meets or exceeds each of the specified performance requirements.

SD-07 Certificates

Fabrications
Qualifications

Solid polymer manufacturer's certification attesting to fabricator qualification approval.

SD-10 Operation and Maintenance Data

Solid polymer material
Clean-up

A minimum of six copies of maintenance data indicating manufacturer's care, repair and cleaning instructions. Maintenance video shall be provided, if available. Maintenance kit for matte finishes shall be submitted.

1.4 DELIVERY, STORAGE AND HANDLING

Materials shall not be delivered to project site until areas are ready for installation. Materials shall be stored indoors and adequate precautions taken to prevent damage to finished surfaces. Protective coverings shall be provided to prevent physical damage or staining following installation, for duration of project.

1.5 WARRANTY

Manufacturer's warranty of ten years against defects in materials, excluding damages caused by physical or chemical abuse or excessive heat, shall be provided. Warranty shall provide for material and labor for replacement or repair of defective material for a period of ten years after component installation.

1.6 QUALIFICATIONS

To insure warranty coverage, solid polymer fabricators shall be certified to fabricate by the solid polymer material manufacturer being utilized. All fabrications shall be marked with the fabricator's certification label affixed in an inconspicuous location. Fabricators shall have a minimum of 5 years of experience working with solid polymer materials.

1.7 MOCK-UP

Prior to final approval of shop drawings, a full-size mock-up shall be provided of a typical countertop where multiple units are required. The mock-up shall include all solid polymer components required to provide a completed unit. The mock-up shall utilize finishes in patterns and colors indicated on the drawings. Should the mock-up not be approved, the Contractor shall re-work or remake it until approval is secured. Rejected units shall be removed from the jobsite. Approved mock-up may remain as part of the finished work.

PART 2 PRODUCTS

2.1 MATERIAL

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Solid polymer material shall be a homogeneous filled solid polymer; not coated, laminated or of a composite construction; meeting ANSI Z124.3 and ANSI Z124.6 requirements. Material shall have minimum physical and performance properties specified. Superficial damage to a depth of 0.01 inch shall be repairable by sanding or polishing. Material thickness shall be as indicated on the drawings. In no case shall material be less than 1/4 inch in thickness.

2.1.1.1 Cast, 100 Percent Acrylic Polymer Solid Surfacing Material

Cast, 100 percent acrylic solid polymer material shall be composed of acrylic polymer, mineral fillers, and pigments and shall meet the following minimum performance requirements:

PROPERTY	REQUIREMENT (min. or max.)			TEST PROCEDURE
Tensile Strength	6000 psi (min.)			ASTM D 638
Hardness	3.02 x 10 ⁻⁶ psi/in/in/C			ASTM D 2583
Thermal Expansion	1.80 x 10 ⁻⁶ in/in/F (max.)			ASTM D 785
Boiling water Surface Resistance	No Change			NEMA Z 124.3
High Temperature Resistance	No Change			NEMA LD 3-3.10
Impact Resistance (Ball drop)				NEMA LD 3-303
1/2" sheet	144", 1/2 lb ball, no failure			
Bowls (Point Impact)	No cracks or chips			ANSI Z 124.3 AND 124.6
Mold & Mildew Growth	No growth			ASTM G 21
Bacteria Growth	No Growth			ASTM D 1499
Liquid Absorption (Weight in 24 hrs.)	0.1% max.			ASTM D 570
Flammability	1/4"	1/2"	3/4"	ASTM E 84
Flame Spread	25	5	5	
Smoke Developed	25	10	15	
Class Rating	1	1	1	

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PROPERTY	REQUIREMENT (min. or max.)	TEST PROCEDURE
Tensile Modulus	1.5 x 106 psi	ASTM D 638
Flexural Modulus	1.4 x 106 psi	ASTM D 790
Strain at Break	0.81%	ASTM D 638
Work to Break	2.48 in.lbs	ASTM D 638
Thermal Conductivity	7.0 Btu/hr/sq ft F	ASTM D 696
Specific Heat	0.2935 + (0.001%C) pcu/lb C	Dupont Test
Volumetric Heat Capacity	0.33 Btu/lb F	Dupont Test
Gloss (60 Gardner)	5-80 (matte-polished)	NEMA LD 3-3.15
Color Stability	No change - 200 hours	NEMA LD 3-3.10
Wear and Cleanability	Passes	ANSI Z 124.3
Abrasion Resistance	No loss of pattern Wt loss (1,000 cycles)-0.2gm Wear (10,000 cycles)-.008 inch	NEMA LD 3-3.10
Conductive Heat Resistance	No Change	
Stain Resistance	Passes Rating - 41 (modified- add'l stains used)	ANSI Z 124.3 ANSI Z 124.3(modified)
Weatherability	No Change - 1000 hours	ANSI D 1499
Specific Gravity:		
Solid colors	1.8	
Particulate colors	1.69	
Material Weight	1/4" 1/2" 3/4"	
Solid colors	2.35 4.7 7.0 lbs/sq.ft.	
Particulate colors	2.1 4.2 6.2 lbs/sq.ft.	
Water Absorption	After 24 hrs.	Long Term ASTM D570
3/4" sheet	0.04%	0.94%
1/4" sheet	0.090%	0.8%

2.1.2 Material Patterns and Colors

Patterns and colors for all solid polymer components and fabrications shall be those indicated on the project color schedule. Pattern and color shall occur, and shall be consistent in appearance, throughout the entire depth (thickness) of the solid polymer material.

2.1.3 Surface Finish

Exposed finished surfaces and edges shall receive a uniform appearance. Exposed surface finish shall be semigloss; gloss rating of 25-50 .

2.2 ACCESSORY PRODUCTS

Accessory products, as specified below, shall be manufactured by the solid polymer manufacturer or shall be products approved by the solid polymer manufacturer for use with the solid polymer materials being specified.

2.3 FABRICATIONS

Components shall be factory or shop fabricated to the greatest extent practical to sizes and shapes indicated, in accordance with approved Shop Drawings and manufacturer's requirements. Factory cutouts shall be provided for sinks, lavatories, and plumbing fixtures where indicated on the drawings. Contours and radii shall be routed to template, with edges smooth. Defective and inaccurate work will be rejected.

2.3.1 Toilet/Shower Partition System

Floor-mounted, solid polymer toilet partition system shall be provided to dimensions and in locations as shown on the drawings. Panels and pilasters shall be fabricated from manufacturer's standard 1 inch thick sheet product. System shall include all necessary hardware for installation and mounting of panels, pilasters, and doors.

PART 3 EXECUTION

3.1 COORDINATION

In most instances, installation of solid polymer fabricated components and assemblies will require strong, correctly located structural support provided by other trades. To provide a stable, sound, secure installation, close coordination is required between the solid polymer fabricator/installer and other trades to insure that necessary structural wall support, cabinet counter top structural support, proper clearances, and other supporting components are provided for the installation of wall panels, countertops, shelving, and all other solid polymer fabrications to the degree and extent recommended by the solid polymer manufacturer. Contractor shall appropriate staging areas for solid polymer fabrications.

3.2 INSTALLATION

3.2.1 Components

All components and fabricated units shall be installed plumb, level, and rigid. Field joints between solid polymer components to provide a monolithic appearance shall be made using solid polymer manufacturer's approved seam adhesives, with joints inconspicuous in the finished work. Metal or vitreous china sinks and lavatory bowls shall be attached to counter tops using solid polymer manufacturer's recommended clear silicone

sealant and mounting hardware. Solid polymer sinks and bowls shall be installed using a color-matched seam adhesive. Plumbing connections to sinks and lavatories shall be made in accordance with Section 15400 PLUMBING, GENERAL PURPOSE.

3.2.1.1 Loose Counter Top Splashes

Loose splashes shall be mounted in locations as noted on the drawings. Loose splashes shall be adhered to the counter top with a color matched silicone sealant when the solid polymer components are solid colors. Adhesion of particulate patterned solid polymer splashes to counter tops shall utilize a clear silicone sealant.

3.2.2 Silicone Sealant

A clear, silicone sealant or caulk shall be used to seal all expansion joints between solid polymer components and all joints between solid polymer components and other adjacent surfaces such as walls, floors, ceiling, and plumbing fixtures. Sealant bead shall be smooth and uniform in appearance and shall be the minimum size necessary to bridge any gaps between the solid surfacing material and the adjacent surface. Bead shall be continuous and run the entire length of the joint being sealed.

3.2.3 Plumbing

Plumbing connections to sinks and lavatories shall be made in accordance with Section 15400.

3.3 CLEAN-UP

Components shall be cleaned after installation and covered to protect against damage during completion of the remaining project items. Components damaged after installation by other trades will be repaired or replaced at the General Contractor's cost. Component supplier will provide a repair/replace cost estimate to the General Contractor who shall approve estimate before repairs are made.

-- End of Section --

SECTION 08210

WOOD DOORS
09/99

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM E 90	(1997) Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements
ASTM E 152	(1981; Rev. A) Fire Tests of Door Assemblies
ASTM E 283	(1991) Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen

ARCHITECTURAL WOODWORK INSTITUTE (AWI)

AWI Qual Stds	(1997) Architectural Woodwork Quality Standards and Quality Certification Program
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NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA LD 3	(1995) High-Pressure Decorative Laminates
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NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 80	(1995) Fire Doors and Fire Windows
NFPA 252	(1995) Fire Tests of Door Assemblies

WINDOW AND DOOR MANUFACTURERS ASSOCIATION (WDMA)

NWWDA I.S. 1-A	(1993) Architectural Wood Flush Doors
NWWDA I.S. 4	(1994) Water-Repellent Preservative Non-Pressure Treatment for Millwork
NWWDA I.S. 6	(1991) Wood Stile and Rail Doors
NWWDA TM-5	(1990) Split Resistance Test
NWWDA TM-7	(1990) Cycle - Slam Test
NWWDA TM-8	(1990) Hinge Loading Resistance Test

UNDERWRITERS LABORATORIES (UL)

UL 10B

(1997) Fire Tests of Door Assemblies

1.2 SUBMITTALS

Submit the following in accordance with Section 01330, "Submittal Procedures."

SD-02 Shop Drawings

Doors

Submit drawings or catalog data showing each type of door unit. Drawings and data shall indicate door type and construction, sizes, thickness, and glazing,.

SD-03 Product Data

Doors

Accessories

Water-resistant sealer

Sample warranty

Sound transmission class rating

Fire resistance rating

SD-04 Samples

Doors

Prior to the delivery of wood doors, submit a sample section of each type of door which shows the stile, rail, veneer, finish, and core construction.

Door finish colors

Submit a minimum of three color selection samples for selection by the Contracting Officer.

SD-06 Test Reports

Split resistance

Cycle-slam

Hinge loading resistance

Submit split resistance test report for doors tested in accordance with NWWDA TM-5, cycle-slam test report for doors tested in accordance with NWWDA TM-7, and hinge loading resistance test report for doors tested in accordance with NWWDA TM-8.

1.3 DELIVERY, STORAGE, AND HANDLING

Deliver doors to the site in an undamaged condition and protect against damage and dampness. Stack doors flat under cover. Support on blocking, a minimum of 4 inches thick, located at each end and at the midpoint of the door. Store doors in a well-ventilated building so that they will not be exposed to excessive moisture, heat, dryness, direct sunlight, or extreme changes of temperature and humidity. Do not store in a building under construction until concrete, masonry work, and plaster are dry. Replace defective or damaged doors with new ones.

1.4 WARRANTY

Warranty shall warrant doors free of defects as set forth in the door manufacturer's standard door warranty.

PART 2 PRODUCTS

2.1 DOORS

Provide doors of the types, sizes, and designs indicated.

2.1.1 Stile and Rail Doors

Premium grade Ponderosa Pine doors or premium or select stile and rail doors conforming to NWWDA I.S. 6. When laminated panels are furnished, they shall be not less than three ply. Flat panels shall have a minimum finished panel thickness of 1/2 inch. Raised panels shall have a minimum finished panel thickness of 3/4 inch.

Stiles and rails shall be bonded under pressure to the core with Type 2 glue. Core assembly shall be abrasive planed on both sides to a uniform thickness. Crossbands and face veneers shall be laminated to the core assembly with Type 1 glue by the hot press method.

Solid wood components shall be thoroughly kiln dried to 6% moisture content. Stiles shall be 1-1/8" laminated hardwood with non-jointed single piece edge bands matching face veneers. (Option: Stiles shall be 1-1/8" laminated hardwood faced with same veneer species and cut to match faces. Veneer shall be applied after prefitting and beveling to conceal cross-banding.) Top rails shall be minimum 1-1/8" solid wood. Bottom rails shall be minimum 1-1/8" solid wood. Provide solid wood blocking to provide screw anchoring for surface mounted exit devices. Top rails shall be wide enough to provide screw anchoring for surface applied closers.

2.1.2 Flush Doors

Flush doors shall conform to NWWDA I.S. 1-A. Hollow core doors shall have lock blocks and one inch minimum thickness hinge stile. Stile edge bands of doors to receive natural finish shall be hardwood, compatible with face veneer. Stile edge bands of doors to be painted shall be mill option specie. No visible finger joints will be accepted in stile edge bands. When used, locate finger-joints under hardware.

2.1.2.1 Interior Flush Doors

Provide particleboard core, Type II flush doors conforming to NWWDA I.S. 1-A with faces of premium grade white oak.

2.1.3 Bi-Fold Closet Doors

THOMSON ELEMENTARY SCHOOL
RENOVATION AND ADDITION

Provide doors premium or select grade, conforming to NWWDA I.S. 6. Doors shall be 1 3/8 inch thick. Equip doors with the manufacturer's standard hardware, including tracks, hinges, guides, and pulls.

2.1.4 Sliding Cabinet Doors

Doors shall conform to NWWDA I.S. 6 premium or select grade. Doors shall be 1 1/8 inch thick. Equip doors with the manufacturer's standard hardware.

2.1.5 Acoustical Doors

NWWDA I.S. 1-A, solid core, constructed to provide Sound Transmission Class rating of 47 when tested in accordance with ASTM E 90.

2.1.6 Fire Doors

Doors specified or indicated to have a fire resistance rating shall conform to the requirements of UL 10B, ASTM E 152, or NFPA 252 for the class of door indicated. Affix a permanent metal label with raised or incised markings indicating testing agency's name and approved hourly fire rating to hinge edge of each door.

Stiles and Rails: Hinge and lock stiles shall be laminated fire stiles to prevent splitting and facilitate secure hardware fastening. Stiles shall be laminated with the same species veneer as face veneer or plastic laminate to conceal cross banding veneers. Stiles shall be glued under pressure to the core. Minimum 5"x12" lock blocks shall be glued under pressure to stiles and core to facilitate surface attachment of panic exit devices as required.

Top and bottom rails shall be laminated fire rails glued under pressure to the core. Provide 5" laminated fire rails, top and/or bottom, to facilitate surface attachment of closers, pivot hinges, fire exit hardware and flush bolts as required.

Stiles and rails shall be glued under pressure to the core with Type 2 glue. Core assembly shall be abrasively planed on both sides to constant and uniform thickness. Crossbands and face veneers shall be laminated to the core with Type 1 glue by the hot press method.

Stile edge screw withdrawal when tested in accordance with ASTM D-1037-78 shall exceed 740 lbs. of pull/ screw. Stile edge split resistance when tested in accordance with ASTM D-143-52 (78) (modified) shall exceed 750 lbs. of pull/screw.

Provide 20 minute pairs with fire retardant stiles at meeting edges to eliminate the need for steel astragals. For 45, 60, and 90 minute pairs, provide steel astragal sets as required.

2.2 [Enter Appropriate Subpart Title Here] 2.2.1 Door Light Openings

Provide glazed openings with same specie and color as the face veneer. Provide glazed openings in fire-rated doors with fire rated frames. Glazing is specified in Section 08800N, "Glazing."

Provide metal vision panels for doors with lights. Frames shall be listed by an independent testing agency acceptable to the local authority having jurisdiction. (Option: Provide wood veneered metal vision panels of specie to match door face).

2.2.2 Additional Hardware Reinforcement

Provide fire rated doors with hardware reinforcement blocking. Size of lock blocks shall be as required to secure the hardware specified. Reinforcement blocking shall be in compliance with the manufacturer's labeling requirements and shall not be mineral material similar to the core.

Premachine for all locks, hinges, and other hardware not considered rim or surface mounted. Fitting: Prefit doors with an overall clearance of 1/4" (1/8" at each stile). Provide 1/8" clearance at top of doors and 3/4" at floor unless otherwise noted. For 20 minute doors, provide 3/4" clearance above non-combustible floors and 3/8" above non-combustible sills.

2.3 FABRICATION

2.3.1 Marking

Each door shall bear a stamp, brand, or other identifying mark indicating quality and construction of the door.

2.3.2 Quality and Construction

Identify the standard on which the construction of the door was based and identify doors having a Type I glue bond.

2.3.3 Adhesives and Bonds

NWWDA I.S. 1-A. Use Type I bond for exterior doors and Type II bond for interior doors. Adhesive for doors to receive a natural finish shall be nonstaining.

2.3.4 Prefitting

At the Contractor's option, doors may be provided factory pre-fit. Doors shall be sized and machined at the factory by the door manufacturer in accordance with the standards under which they are produced. The work shall include sizing, bevelling edges, mortising, and drilling for hardware and providing necessary beaded openings for glass. Provide the door manufacturer with the necessary hardware samples, and frame and hardware schedules as required to coordinate the work.

2.3.5 Finishes

2.3.5.1 Field Painting

Factory prime or seal doors, and field paint as specified in Section 09900, "Paints and Coatings."

2.3.5.2 Factory Finish

Provide doors finished at the factory by the door manufacturer as follows: AWI Qual Stds Section 1500, specification for System No. 4 Conversion varnish alkyd urea or System No. 5 Vinyl catalyzed. The coating shall be AWI Qual Stds premium, medium rubbed sheen, open grain effect. Use stain

when required to produce the finish specified for color. Seal edges, cutouts, trim, and wood accessories, and apply two coats of finish compatible with the door face finish. Touch-up finishes that are scratched or marred, or where exposed fastener holes are filled, in accordance with the door manufacturer's instructions. Match color and sheen of factory finish using materials compatible for field application.

2.3.5.3 Plastic Laminate Finish

Factory applied, NEMA LD 3, General or Specific purpose type, 0.050 inch minimum thickness. Glue laminated plastic for hollow core doors to wood veneer, plywood, or hardboard backing to form door panel. Combined minimum thickness of laminate sheet and backing shall be 0.10 inch.

2.3.5.4 Color

Provide door finish colors shall be white birch.

2.3.6 Water-Resistant Sealer

Provide a water-resistant sealer compatible with the specified finish as approved and as recommended by the door manufacturer.

2.4 SOURCE QUALITY CONTROL

Stiles of "B" and "C" label fire doors utilizing standard mortise leaf hinges shall meet the following performance criteria:

- a. Split resistance: Average of ten test samples shall be not less than 500 pounds load when tested in accordance with NWWDA TM-5.
- b. Cycle-slam: 200,000 cycles with no loose hinge screws or other visible signs of failure when tested in accordance with the requirements of NWWDA TM-7.
- c. Hinge loading resistance: Average of ten test samples shall be not less than 700 pounds load when tested for direct screw withdrawal in accordance with NWWDA TM-8 using a No. 12, 1 1/4 inch long, steel, fully threaded wood screw. Drill 5/32 inch pilot hole, use 1 1/2 inch opening around screw for bearing surface, and engage screw full, except for last 1/8 inch. Do not use a steel plate to reinforce screw area.

PART 3 EXECUTION

3.1 INSTALLATION

Before installation, seal top and bottom edges of doors with the approved water-resistant sealer. Seal cuts made on the job immediately after cutting using approved water-resistant sealer. Fit, trim, and hang doors with a 1/16 inch minimum, 1/8 inch maximum clearance at sides and top, and a 3/16 inch minimum, 1/4 inch maximum clearance over thresholds. Provide 3/8 inch minimum, 7/16 inch maximum clearance at bottom where no threshold occurs. Bevel edges of doors at the rate of 1/8 inch in 2 inches. Door warp shall not exceed 1/4 inch when measured in accordance with NWWDA I.S. 1-A.

3.1.1 Fire Doors

THOMSON ELEMENTARY SCHOOL
RENOVATION AND ADDITION

Install fire doors in accordance with NFPA 80. Do not paint over labels.

-- End of Section --

SECTION 09650

RESILIENT FLOORING
08/02

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 2240	(2002) Rubber Property - Durometer Hardness
ASTM D 4078	(1992; R 1996) Water Emulsion Floor Polish
ASTM E 648	(2000) Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source
ASTM E 662	(2001) Specific Optical Density of Smoke Generated by Solid Materials
ASTM F 510	(1993; R 1999) Resistance to Abrasion of Resilient Floor Coverings Using an Abrader with a Grit Feed Method
ASTM F 1066	(1999) Vinyl Composition Floor Tile
ASTM F 1303	(1999) Sheet Vinyl Floor Covering with Backing
ASTM F 1344	(2000) Rubber Floor Tile
ASTM F 1700	(1999) Solid Vinyl Floor Tile
ASTM F 1913	(1998) Vinyl Sheet Floor Covering Without Backing

1.2 FIRE RESISTANCE REQUIREMENTS

Flooring in corridors and exits shall have a minimum average critical radiant flux of 0.22 watts per square centimeter when tested in accordance with ASTM E 648. The smoke density rating shall be less than 450 when tested in accordance with ASTM E 662.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only or as otherwise designated. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Sheet Flooring
Tile Flooring

Drawings indicating location of seams, integral cove, including details of outside corner and cap, and edge strips.

SD-03 Product Data

Tile Flooring
Sheet Flooring
Accessories for Sheet Vinyl
Integral Coved Base
Adhesive for Sheet Vinyl
Adhesive for Vinyl Composition Tile
Adhesive for Wall Base

Manufacturer's descriptive data and installation instructions including cleaning and maintenance instructions.

SD-04 Samples

Tile Flooring
Sheet Flooring
Seaming Bead
Wall Base

Three samples of each indicated color and type of flooring and base. Sample size shall be minimum 2-1/2 x 4 inches.

SD-06 Test Reports

Moisture Test

Copies of test reports showing that representative product samples of the flooring proposed for use have been tested by an independent testing laboratory within the past three years or when formulation change occurred and conforms to the requirements specified.

SD-08 Manufacturer's Instructions

Sheet Flooring
Tile Flooring

Copies of flooring manufacturer's recommended installation procedures.

SD-10 Operation and Maintenance Data

Data Package 1

Data Package in accordance with Section 01781 OPERATION AND MAINTENANCE DATA.

1.4 DELIVERY AND STORAGE

THOMSON ELEMENTARY SCHOOL
RENOVATION AND ADDITION

Materials shall be delivered to the building site in original unopened containers bearing the manufacturer's name, brands, stock names, production run, project identification, and handling instructions. Materials shall be stored in a clean dry area with temperature maintained above 70 degrees F for 2 days prior to installation, and shall be stacked according to manufacturer's recommendations. Materials shall be protected from the direct flow of heat from hot-air registers, radiators and other heating fixtures and appliances. Do not open containers until materials are to be used, except for inspection to verify compliance with requirements.

1.5 ENVIRONMENTAL REQUIREMENTS

a. Areas to receive resilient flooring shall be maintained at a temperature above 70 degrees F and below 100 degrees F for 2 days before application, during application and 2 days after application. A minimum temperature of 55 degrees F shall be maintained thereafter.

b. Provide adequate ventilation to remove moisture from area and to comply with regulations limiting concentrations of hazardous vapors.

1.6 SCHEDULING

Resilient flooring application shall be scheduled after the completion of other work which would damage the finished surface of the flooring.

1.7 WARRANTY

Manufacturer's standard performance guarantees or warranties that extend beyond a one year period shall be provided.

1.8 EXTRA MATERIALS

Extra flooring material of each color and pattern shall be furnished at the rate of 5 tiles for each 1000 tiles installed. Extra materials shall be from the same lot as those installed. Extra base material composed of 20 linear feet of each color shall be furnished. All extra materials shall be packaged in original containers, properly marked.

PART 2 PRODUCTS

2.1 UNDERLAYMENT

Underlayment shall be latex type, as recommended by flooring manufacturer. Wood and hardboard underlayments are specified in Section 06100N ROUGH CARPENTRY.

2.2 TILE FLOORING

2.2.1 Vinyl-Composition

Vinyl-composition tile shall conform to ASTM F 1066, Class 2, (through pattern tile), Composition 1, asbestos-free, and shall be 12 inches square and 1/8 inch thick. Tile shall have the color and pattern uniformly distributed throughout the thickness of the tile. Flooring in any one continuous area shall be from the same lot and shall have the same shade and pattern.

2.2.2 Solid Vinyl Type A

THOMSON ELEMENTARY SCHOOL
RENOVATION AND ADDITION

Solid vinyl tile shall conform to ASTM F 1700 Class I, Type A. Tile shall be 12 inches square by 1/8 inch thick. Tiles shall be of solid un laminated construction.

AND 2.2.3 Stair Treads, and Risers

Treads, and risers shall conform to composition vinyl compounded from virgin polymer or copolymer of vinyl chloride resin, plasticized with phosphate or phthalate esters. Overall thickness shall be not less than 3/32 inch. Design shall be either a one piece nosing/tread/riser or a two piece nosing/tread with a matching coved riser. Installation shall include stringer angles on both the wall and banister sides, and landing trim. Surface of treads shall be raised diamond pattern.

2.2.4 Lining Felt

Asphalt felt shall be as recommended by flooring manufacturer.

2.2.5 Adhesive for Vinyl Composition Tile

Cutback adhesive for installation of tile over concrete above, on or above grade. Moisture and alkali resistant. Non-asbestos formulated or a latex adhesive recommended by flooring manufacturer.

2.2.6 Adhesive for Wall Base

Adhesive for wall base shall be emulsified acrylic latex; non-flamable.

2.3 STRIPS

2.3.1 Edge

Provide carpet reducer of vinyl and approved by flooring manufacturer. Limit vertical lips in edge strips to 1/4 inch; limit total rise to 1/2 inch.

2.3.2 Feature/Transition Strip

Feature strips shall be vinyl, 1 inch wide, and of thickness to match the flooring. Color shall be as indicated.

2.3.3 Transition

A vinyl transition strip tapered to meet abutting material shall be provided.

2.4 WALL BASE

Base shall be manufacturers standard vinyl, straight style (installed with carpet) and coved style (installed with resilient flooring). Base shall be 4 inches high and a minimum 1/8 inch thick, in color as noted in Color Schedule, and in matte finish. Preformed outside corners shall be furnished. Use flexible base to conform to irregularities in walls, partitions, and floors. Provide premolded corners in matching size, shape, and color for all right-angle inside and outside corners.

Provide color and pattern as indicated in Color Schedule.

2.5 POLISH/FINISH

THOMSON ELEMENTARY SCHOOL
RENOVATION AND ADDITION

Polish shall conform to ASTM D 4078. Use flooring manufacturer's standard high-solids finish for shine without buffing; non-flamable; compatible with factory-applied finish; may be buffed or burnished for maximum gloss.

2.6 CAULKING AND SEALANTS

Caulking and sealants shall be in accordance with Joint Sealant Specification Section.

2.7 MANUFACTURER'S COLOR AND TEXTURE

Color and distinct pattern shall be uniformly distributed throughout thickness of tile. Color and texture shall be as noted in Color Schedule. Flooring in continuous area or replacement of damaged flooring in continuous area shall be from same production run with same shade and pattern,

PART 3 EXECUTION

3.1 EXAMINATION/VERIFICATION OF CONDITIONS

The Contractor shall examine and verify that site conditions are in agreement with the design package and shall report all conditions that will prevent a proper installation. The Contractor shall not take any corrective action without written permission from the Government.

3.1.1 Removal of Existing Flooring

Remove existing flooring and adhesive in accordance with Section 02225 SELECTIVE BUILDING DEMOLITION and in accordance with new flooring manufacturer's printed instructions.

3.1.2 Subfloor Requirements

Provide subfloor as specified in Section 03300 CAST-IN-PLACE STRUCTURAL CONCRETE.

After removal of existing flooring and adhesive, provide leveling as required to create acceptable conditions for new work. This includes, but is not limited to, providing necessary adjustments for uneven existing substrate floor.

3.1.3 Surface Examination

Examine surfaces to receive sheet vinyl flooring. Correct conditions which will impair proper installation, including:

- a. Variation in surface level greater than 1/8 inch in 10 feet.
- b. Trowel marks, pits, dents, protrusions.
- c. 1/16 inch wide or wider cracks.
- d. Chalk and dust.
- e. Oil, paint, wax, and other deleterious substances.

f. Moisture.

h. Concrete curing agents, paint, and sealers that can inhibit bonding or harm flooring.

3.2 SURFACE PREPARATION

Flooring shall be in a smooth, true, level plane, except where indicated as sloped. Before any work under this section is begun, all defects such as rough or scaling concrete, low spots, high spots, and uneven surfaces shall have been corrected, and all damaged portions of concrete slabs shall have been repaired as recommended by the flooring manufacturer. Concrete curing compounds, other than the type that does not adversely affect adhesion, shall be entirely removed from the slabs. Paint, varnish, oils, release agents, sealers, waxers, and adhesives shall be removed, as recommended by the flooring manufacturer.

3.2.1 Concrete Floor

Grind ridges and other uneven surfaces smooth. Cut out and fill cracks 1/16 inch or wider with crack filler. Provide mastic underlayment to fill remaining holes, cracks, and depressions and for smoothing, leveling, or creating a feather edge in accordance with instructions of mastic manufacturer. After cleaning and removal of loose particles, prime chalky or dusty surfaces with primer recommended by flooring manufacturer.

3.3 MOISTURE TEST

The suitability of the concrete subfloor for receiving the resilient flooring with regard to moisture content shall be determined by a moisture test as recommended by the flooring manufacturer.

3.4 GENERAL APPLICATION REQUIREMENTS

To avoid damage, install flooring after other work in same area has been completed. Apply flooring and accessories in accordance with manufacturer's directions, using experienced workers. Detailed requirements follow:

a. Adhesives: Do not allow smoking, open flames or other sources of ignition in area where solvent-containing adhesives are being used or spread, after posting conspicuous signs reading "NO SMOKING OR OPEN FLAME".

b. Flooring: Apply in patterns indicated. Start in center of room or area, and work toward edges. Keep tile lines and joints square, symmetrical, tight, and even. Keep each floor in true, level plane, except where slope is indicated. Vary width of edge tiles as necessary to maintain full-size tiles in field, but no edge tile shall be less than one-half full size, except where irregular-shape makes it impossible.

c. Cutting: Cut flooring edges and scribe to walls and partitions after field flooring has been applied.

d. Edge Strips: Provide edging strips where flooring terminates at points higher than contiguous finished flooring, except where thresholds are provided. Secure plastic strips with adhesive.

3.5 INSTALLATION OF VINYL-COMPOSITION TILE

Tile flooring shall be installed with adhesive in accordance with the manufacturer's installation instructions. Tile lines and joints shall be kept square, symmetrical, tight, and even. Edge width shall vary as necessary to maintain full-size tiles in the field, but no edge tile shall be less than one-half the field tile size, except where irregular shaped rooms make it impossible. Flooring shall be cut to, and fitted around, all permanent fixtures, built-in furniture and cabinets, pipes, and outlets. Edge tile shall be cut, fitted, and scribed to walls and partitions after field flooring has been applied.

3.6 INSTALLATION OF FEATURE STRIPS

Edge strips shall be secured with adhesive as recommended by the manufacturer. Edge strips shall be provided at locations where flooring termination is higher than the adjacent finished flooring, except at doorways where thresholds are provided.

3.7 INSTALLATION OF WALL BASE

Wall base shall be installed with adhesive in accordance with the manufacturer's written instructions. Base joints shall be tight and base shall be even with adjacent resilient flooring. Voids along the top edge of base at masonry walls shall be filled with caulk. Roll entire vertical surface of base with hand roller, and press toe of base with a straight piece of wood to ensure proper alignment. Avoid excess adhesive in corners.

3.8 INSTALLATION OF TREADS AND RISERS

Stair treads and risers shall be installed with adhesive in accordance with the manufacturer's written installation instructions. Treads and risers shall cover the full width of the stairs. Stairs wider than manufacturer's standard lengths shall have equal length pieces butted together to cover the treads.

3.9 INSTALLATION OF INTEGRAL COVED BASE

Integral coved base shall be formed by extending the flooring material 4 inches onto the wall surface. Cove shall be supported by a plastic, rubber or wood coved filler having a minimum radius of 3/4 inch. Coved base shall be installed with adhesive in accordance with the manufacturer's written instructions. A metal or vinyl cap strip shall be provided at the top of the base. Voids along the top edge of base at masonry walls shall be filled with caulk.

3.10 CLEANING

Immediately upon completion of installation of tile in a room or an area, flooring and adjacent surfaces shall be dry-cleaned to remove all surplus adhesive. No sooner than 5 days after installation, flooring shall be washed with a nonalkaline cleaning solution, rinsed thoroughly with clear cold water, and, except for raised pattern rubber flooring, rubber tile and sheet rubber flooring, rubber stair treads, and static control vinyl tile, given two coats of polish in accordance with manufacturers written instructions. Raised pattern rubber flooring, rubber tile and sheet rubber flooring, rubber stair treads, and static control vinyl tile shall be cleaned and maintained as recommended by the manufacturer.

THOMSON ELEMENTARY SCHOOL
RENOVATION AND ADDITION

- a. Vinyl flooring, except prewaxed flooring and flooring designated as no-wax or never-wax by manufacturer, shall have two coats of polish applied and each coat buffed to an even luster with an electric polishing machine, using a lamb's wool pad when dry buffing.
- b. Translucent or transparent-surfaced sheet vinyl flooring shall be cleaned by damp mopping. Do not buff finish. Follow flooring manufacturer's cleaning and maintenance instructions.

3.11 PROTECTION

From the time of laying until acceptance, flooring shall be protected from damage as recommended by the flooring manufacturer. Flooring which becomes damaged, loose, broken, or curled and cove base which is not tight to backing fillet shall be removed and replaced.

-- End of Section --

SECTION 09680A

CARPET
05/01

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS (AATCC)

AATCC 16	(1998) Test Method: Colorfastness to Light
AATCC 134	(1996) Test Method: Electrostatic Propensity of Carpets
AATCC 165	(1999) Test Method: Colorfastness to Crocking: Carpets - AATCC Crockmeter Method

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 297	(1993; R 1998) Rubber Products - Chemical Analysis
ASTM D 418	(1993; R 1997) Pile Yarn Floor Covering Construction
ASTM D 1423	(1999) Twist in Yarns by the Direct-Counting Method
ASTM D 1667	(1997) Flexible Cellular Materials - Vinyl Chloride Polymers and Copolymers (Closed-Cell Foam)
ASTM D 3278	(1996e1) Test Methods for Flash Point of Liquids by Small Scale Closed-Cup Apparatus
ASTM D 3676	(1996a) Rubber Cellular Cushion Used for Carpet or Rug Underlay
ASTM D 5252	(1998a) Practice for the Operation of the Hexapod Tumble Drum Tester
ASTM D 5417	(1999) Practice for Operation of the Vettermann Drum Tester
ASTM E 648	(2000) Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source

CARPET AND RUG INSTITUTE (CRI)

THOMSON ELEMENTARY SCHOOL
RENOVATION AND ADDITION

CRI 104 (1996) Commercial Carpet Installation
Standard

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

16 CFR 1630 Standard for the Surface Flammability of
Carpet and Rugs (FF 1-70)

40 CFR 247 Comprehensive Procurement Guideline for
Products Containing Recovered Materials

GERMANY INSTITUTE FOR STANDARDIZATION (DIN)

DIN 54318 (1986) Machine-Made Textile Floor
Coverings; Determination of Dimensional
Changes Due to the Effects of Varied Water
and Heat Conditions; Identical with ISO
2551 Edition 1981

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Installation
Molding

Three copies of drawings indicating areas receiving carpet, carpet types, textures and patterns, direction of pile, location of seams, and locations of edge molding.

SD-03 Product Data

Carpet

Manufacturer's catalog data and printed documentation stating physical characteristics, durability, resistance to fading, and flame resistance characteristics for each type of carpet material and installation accessory.

Surface Preparation
Installation

Three copies of the manufacturer's printed installation instructions for the carpet, including preparation of substrate, seaming techniques, and recommended adhesives and tapes.

Regulatory Requirements

Three copies of report stating that carpet contains recycled materials and/or involvement in a recycling or reuse program. Report shall include percentage of recycled material.

SD-04 Samples

Carpet
Molding

a. Carpet: Two "Production Quality" samples 18 x 18 inches of each carpet proposed for use, showing quality, pattern, and color specified.

b. Vinyl or Aluminum Moldings: Two pieces of each type at least 12 inches long.

c. Special Treatment Materials: Two samples showing system and installation method.

SD-06 Test Reports

Moisture and Alkalinity Tests

Three copies of test reports of moisture and alkalinity content of concrete slab stating date of test, person conducting the test, and the area tested.

SD-07 Certificates

Carpet

Certificates of compliance from a laboratory accredited by the National Laboratory Accreditation Program of the National Institute of Standards and Technology attesting that each type of carpet and carpet with cushion material conforms to the standards specified.

Regulatory Requirements

Report stating that the carpet contains recycled materials and indicating the actual percentage of recycled material.

SD-10 Operation and Maintenance Data

Carpet
Cleaning and Protection

Three copies of carpet manufacturer's maintenance instructions describing recommended type of cleaning equipment and material, spotting and cleaning methods, and cleaning cycles.

1.3 REGULATORY REQUIREMENTS

Carpet and adhesives shall bear the Carpet and Rug Institute (CRI) Indoor Air Quality (IAQ) label or demonstrate compliance with testing criteria and frequencies through independent laboratory test results. Carpet type bearing the label will indicate that the carpet has been tested and meets the criteria of the CRI IAQ Carpet Testing Program, and minimizes the impact on indoor air quality. Contractor shall procure carpet in accordance with 40 CFR 247. Carpet shall conform to EPA requirements in accordance with Section 01670 RECYCLED / RECOVERED MATERIALS. Where possible, product shall be purchased locally to reduce emissions of fossil fuels from transporting.

1.4 DELIVERY AND STORAGE

Materials shall be delivered to the site in the manufacturer's original wrappings and packages clearly labeled with the manufacturer's name, brand name, size, dye lot number, and related information. Materials shall be stored in a clean, dry, well ventilated area, protected from damage and soiling, and shall be maintained at a temperature above 60 degrees F for 2 days prior to installation.

1.5 ENVIRONMENTAL REQUIREMENTS

Areas in which carpeting is to be installed shall be maintained at a temperature above 60 degrees F for 2 days before installation, during installation, and for 2 days after installation. A minimum temperature of 55 degrees F shall be maintained thereafter for the duration of the contract. Traffic or movement of furniture or equipment in carpeted area shall not be permitted for 24 hours after installation. Other work which would damage the carpet shall be completed prior to installation of carpet.

1.6 WARRANTY

Manufacturer's standard performance guarantees or warranties including minimum ten (10) year wear warranty, two (2) year material and workmanship and ten (10) year tuft bind and delamination.

1.7 EXTRA MATERIAL

Extra material from same dye lot consisting of full width continuous broadloom shall be provided for future maintenance. A minimum of 3 percent of total square yards of each carpet type, pattern, and color shall be provided.

PART 2 PRODUCTS

2.1 CARPET

Carpet shall be first quality; free of visual blemishes, streaks, poorly dyed areas, fuzzing of pile yarn, spots or stains, and other physical and manufacturing defects. Carpet materials and treatments shall be reasonably nonallergenic and free of other recognized health hazards. All grade carpets shall have a static control construction which gives adequate durability and performance.

2.1.1 Physical Characteristics

Carpet shall comply with the following:

- b. Carpet Construction: Tufted.
- c. Type: Broadloom 12 feet minimum usable carpet width with exception of corridors and stairs.
- d. Pile Type: Multilevel loop.
- e. Pile Fiber: Commercial 100% branded (federally registered trademark) nylon continuous filament.

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- f. Pile or Wire Height: Minimum 1 inch in accordance with ASTM D 418.
- g. Yarn Ply: Minimum 2 in accordance with ASTM D 1423.
- h. Gauge or Pitch: Minimum 1/8 inch in accordance with ASTM D 418.
- i. Stitches or Rows/Wires: Minimum 8.5 per square inch.
- j. Finished Pile Yarn Weight: Minimum 26 ounces per square yard. This does not include weight of backings. Weight shall be determined in accordance with ASTM D 418.
- k. Pile Density: Minimum .145 inch.
- l. Dye Method: Yarn (or Skein) dyed.
- m. Backing Materials: Primary backing materials shall be those customarily used and accepted by the trade. Secondary backing to suit project requirements shall be those customarily used and accepted by the trade for each type of carpet, except when a special unitary back designed for gluedown is provided.

2.1.2 Performance Requirements

- a. ARR (Appearance Retention Rating): Carpet shall be tested and have the minimum 3.5-4.0 (Severe) ARR when tested in accordance with either the ASTM D 5252 (Hexapod) or ASTM D 5417 (Vettermann) test methods using the number of cycles for short and long term tests as specified.
- b. Static Control: Static control shall be provided to permanently control static buildup to less than 3.0 kV when tested at 20 percent relative humidity and 70 degrees F in accordance with AATCC 134.
- c. Flammability and Critical Radiant Flux Requirements: Carpet shall comply with 16 CFR 1630. Carpet in corridors and exits shall have a minimum average critical radiant flux of 0.22 watts per square centimeter when tested in accordance with ASTM E 648.
- d. Tuft Bind: Tuft bind force required to pull a tuft or loop free from carpet backing shall be a minimum 20 pound average force for loop pile.
- e. Colorfastness to Crocking: Dry and wet crocking shall comply with AATCC 165 and shall have a Class 4 minimum rating on the AATCC Color Transference Chart for all colors.
- f. Colorfastness to Light: Colorfastness to light shall comply with AATCC 16, Test Option E "Water-Cooled Xenon-Arc Lamp, Continuous Light" and shall have a minimum 6 grey scale rating after 40 hours.
- g. Delamination Strength: Delamination strength for tufted carpet with a secondary back shall be minimum of 2.5 lbs./inch.

2.2 ADHESIVES AND CONCRETE PRIMER

Adhesives and concrete primers for installation of carpet shall be waterproof, nonflammable, meet local air-quality standards, and shall be as required by the carpet manufacturer. Seam adhesive shall be waterproof, nonflammable, and nonstaining as recommended by the carpet manufacturer.

2.3 MOLDING

Aluminum molding shall be a hammered surface, pinless clamp-down type, designed for the type of carpet being installed. Finish shall be prefinished color to match color of adjacent VCT. Floor flange shall be a minimum 1-1/2 inches wide and face shall be a minimum 5/8 inch wide .

2.4 TAPE

Tape for seams shall be as recommended by the carpet manufacturer for the type of seam used in installation.

2.5 COLOR, TEXTURE, AND PATTERN

Color, texture, and pattern shall be in accordance with the Color Schedule..

PART 3 EXECUTION

3.1 SURFACE PREPARATION

Carpet shall not be installed on surfaces that are unsuitable and will prevent a proper installation. Holes, cracks, depressions, or rough areas shall be repaired using material recommended by the carpet or adhesive manufacturer. Floor shall be free of any foreign materials and swept broom clean. Before beginning work, subfloor shall be tested with glue and carpet to determine "open time" and bond.

3.2 MOISTURE AND ALKALINITY TESTS

Concrete slab shall be tested for moisture content and excessive alkalinity in accordance with CRI 104.

3.3 PREPARATION OF CONCRETE SUBFLOOR

Installation of the carpeting shall not commence until concrete substrate is at least 90 days old. The concrete surfaces shall be prepared in accordance with instructions of the carpet manufacturer. Type of concrete sealer, when required, shall be compatible with the carpet.

3.4 INSTALLATION

All work shall be performed by installers who are CFI certified (International Certified Floorcovering Installer Association), or manufacturer's approved installers. Installation shall be in accordance with the manufacturer's instructions and CRI 104. Edges of carpet meeting hard surface flooring shall be protected with molding; installation shall be in accordance with the molding manufacturer's instructions.

3.4.1 Broadloom Installation

Broadloom carpet shall be installed direct glue down and shall be smooth, uniform, and secure, with a minimum of seams. Seams shall be uniform, unnoticeable, and treated with a seam adhesive. Side seams shall be run

toward the light where practical and where such layout does not increase the number of seams. Breadths shall be installed parallel, with carpet pile in the same direction. Patterns shall be accurately matched. Cutouts, as at door jambs, columns and ducts shall be neatly cut and fitted securely. Seams at doorways shall be located parallel to and centered directly under doors. Seams shall not be made perpendicular to doors or at pivot points. Seams at changes in directions of corridors shall follow the wall line parallel to the carpet direction. Corridors with widths less than 6 feet shall have the carpet laid lengthwise down the corridors.

Contiguous carpeting shall be a product of the same dye lot.

Corrections in measurements made by the Contractor shall be at no additional cost to DCPS.

Transportation of carpet within the jobsite shall be the responsibility of the Contractor.

3.4.1.1 Preparatory Work

Contractor shall verify that surfaces to receive carpet are thoroughly clean, dry, dust-free, and in a satisfactory condition to be carpeted. Contractor shall notify the Contracting Officer in writing of any conditions that will prevent the production of unsatisfactory work.

Start of carpet installation shall be an indication of acceptance of the surfaces as being satisfactory for installing carpeting and the Contractor shall automatically assume the responsibility for any unacceptable finish work caused by floor conditions.

3.5 CLEANING AND PROTECTION

3.5.1 Cleaning

After installation of the carpet, debris, scraps, and other foreign matter shall be removed. Soiled spots and adhesive shall be removed from the face of the carpet with appropriate spot remover. Protruding face yarn shall be cut off and removed. Carpet shall be vacuumed clean.

Equipment, surplus materials, and rubbish from work shall be removed from the site.

3.5.2 Protection

The installed carpet shall be protected from soiling and damage with heavy, reinforced, nonstaining kraft paper, plywood, or hardboard sheets. Edges of kraft paper protection shall be lapped and secured to provide a continuous cover. Traffic shall be restricted for at least 45 hours. Protective covering shall be removed when directed by the Contracting Officer.

3.6 REMNANTS

Remnants remaining from the installation, consisting of scrap pieces more than 2 feet in dimension with more than 6 square feet total, shall be provided. Non-retained scraps shall be removed from site and recycled appropriately.

3.7 ACCEPTANCE PROVISIONS

Contractor shall be fully responsible for the installation upon completion of each area. Installation will be inspected and approved by the Contracting Officer prior to acceptance.

-- End of Section --

SECTION 09900

PAINTS AND COATINGS

02/02

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS (ACGIH)

ACGIH Limit Values	(1991-1992) Threshold Limit Values (TLVs) for Chemical Substances and Physical Agents and Biological Exposure Indices (BEIs)
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ACGIH TLV-DOC	Documentation of Threshold Limit Values and Biological Exposure Indices
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AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI A13.1	Scheme for Identification of Piping Systems
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AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 235	Standard Specification for Mineral Spirits (Petroleum Spirits) (Hydrocarbon Dry Cleaning Solvent)
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ASTM D 523	(1999) Standard Test Method for Specular Gloss
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ASTM C 669	(1995) Glazing Compounds for Back Bedding and Face Glazing of Metal Sash
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ASTM C 920	(1998) Elastomeric Joint Sealants
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ASTM D 2092	(1995) Preparation of Zinc-Coated (Galvanized) Steel Surfaces for Painting
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ASTM D 2824	(1994) Aluminum-Pigmented Asphalt Roof Coatings, Non-Fibered, Asbestos Fibered, and Fibered Without Asbestos
-------------	--

ASTM D 4214	(1998) Evaluating the Degree of Chalking of Exterior Paint Films
-------------	--

ASTM D 4263	(1983; R 1999) Indicating Moisture in Concrete by the Plastic Sheet Method
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ASTM D 4444	(1998) Standard Test Methods for Use and Calibration of Hand-Held Moisture Meters
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ASTM F 1869	(1998) Measuring Moisture Vapor Emission
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THOMSON ELEMENTARY SCHOOL
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Rate of Concrete Subfloor Using Anhydrous
Calcium Chloride

CODE OF FEDERAL REGULATIONS (CFR)

29 CFR 1910.1000	Air Contaminants
29 CFR 1910.1001	Asbestos, Tremolite, Anthophyllite, and Actinolite
29 CFR 1910.1025	Lead
29 CFR 1926.62	Lead Exposure in Construction

FEDERAL AVIATION ADMINISTRATION (FAA)

FAA AC 70/7460-1	(Rev J) Obstruction Marking and Lighting
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FEDERAL STANDARDS (FED-STD)

FED-STD-313	(Rev. C) Material Safety Data, Transportation Data and Disposal Data for Hazardous Materials Furnished to Government Activities
FED-STD-595	(1989 Rev B) Color

MASTER PAINTERS INSTITUTE (MPI)

MPI 1	(2001) Aluminum Paint
MPI 2	(2001) Aluminum Heat Resistant Enamel (up to 427 C and 800 F)
MPI 4	(2001) Interior/Exterior Latex Block Filler
MPI 5	(2001) Exterior Alkyd Wood Primer
MPI 6	(2001) Exterior Latex Wood Primer
MPI 7	(2001) Exterior Oil Wood Primer
MPI 8	(2001) Exterior Alkyd, Flat
MPI 9	(2001) Exterior Alkyd Enamel
MPI 10	(2001) Exterior Latex, Flat
MPI 11	(2001) Exterior Latex, Semi-Gloss
MPI 13	(2001) Exterior Semi-Transparent Stain (Solvent Based)
MPI 16	(2001) Exterior Solid Color Latex Stain
MPI 19	(2001) Inorganic Zinc Primer
MPI 21	(2001) Heat Resistant Enamel, Gloss, (Up to 205 C or 400 F)

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MPI 22	(2001) High Heat Resistant Coating
MPI 23	(2001) Surface Tolerant Metal Primer
MPI 26	(2001) Cementitious Galvanized Metal Primer
MPI 27	(2001) Exterior / Interior Alkyd Floor Enamel, Gloss
MPI 31	(2001) Polyurethane, Moisture Cured, Clear Gloss
MPI 39	(2001) Interior Latex-based Wood Primer
MPI 42	(2001) Latex Stucco and Masonry Textured Coating
MPI 44	Interior Latex, Gloss Level 2
MPI 45	(2001) Interior Primer Sealer
MPI 46	(2001) Interior Enamel Undercoat
MPI 47	(2001) Interior Alkyd, Semi-Gloss
MPI 48	(2001) Interior Alkyd, Gloss
MPI 49	(2001) Interior Alkyd, Flat
MPI 50	(2001) Interior Latex Primer Sealer
MPI 51	(2001) Interior Alkyd, Eggshell
MPI 52	(2001) Interior Latex, Gloss Level 3
MPI 54	(2001) Interior Latex, Semi-Gloss
MPI 56	(2001) Interior Alkyd Dry Fog/Fall
MPI 57	(2001) Interior Oil Modified Clear Urethane, Satin
MPI 59	(2001) Interior/Exterior Alkyd Porch & Floor Enamel, Low Gloss
MPI 60	(2001) Interior/Exterior Latex Porch & Floor Paint, Low Gloss
MPI 68	(2001) Interior/Exterior Latex Porch & Floor Paint, Gloss
MPI 71	(2001) Polyurethane, Moisture Cured, Clear, Flat
MPI 72	(2001) Polyurethane, Two Component, Pigmented, Gloss
MPI 77	(2001) Epoxy Cold Cured, Gloss

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MPI 79	(2001) Marine Alkyd Metal Primer
MPI 90	(2001) Interior Wood Stain, Semi-Transparent
MPI 94	(2001) Exterior Alkyd, Semi-Gloss
MPI 95	(2001) Fast Drying Metal Primer
MPI 101	(2001) Cold Curing Epoxy Primer
MPI 107	(2001) Rust Inhibitive Primer (Water-Based)
MPI 108	(2001) High Build Epoxy Marine Coating
MPI 110	(2001) Interior/Exterior High Performance Acrylic
MPI 113	(2001) Elastomeric Coating
MPI 116	(2001) Epoxy Block Filler
MPI 119	(2001) Exterior Latex, High Gloss (acrylic)
MPI 134	(2001) Waterborne Galvanized Primer
MPI 138	(2001) High Performance Latex, White and Tints - MPI Gloss Level 2
MPI 139	(2001) High Performance Latex, White and Tints - MPI Gloss Level 3
MPI 140	(2001) High Performance Architectural Latex - Gloss Level 4
MPI 141	(2001) High Performance Semigloss Latex, White and Tints - Gloss Level 5
MPI 144	(2001) Institutional Low Odor / VOC Interior Latex, Gloss Level 2
MPI 145	(2001) Institutional Low Odor / VOC Interior Latex, Gloss Level 3
MPI 146	Institutional Low Odor/VOC Interior Latex - Gloss Level 4 (a 'satin-like' finish)
MPI 147	(2001) Institutional Low Odor / VOC Interior Latex, Gloss Level 5

COMMERCIAL ITEM DESCRIPTION (CID)

CID A-A-2904	Thinner, Paint, Mineral Spirits, Regular and Odorless
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U.S. DEPARTMENT OF DEFENSE (DOD)

MIL-STD-101	(Rev. B) Color Code for Pipelines and for
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Compressed Gas Cylinders

SCIENTIFIC CERTIFICATION SYSTEMS (SCS)

SCS-EPP-SP01-01	(2001) Environmentally Preferable Product Specification for Architectural and Anti-Corrosive Paints
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STEEL STRUCTURES PAINTING COUNCIL (SSPC)

SSPC Guide 6	(1997) Containing Debris Generated During Paint Removal Operations
SSPC Guide 7	(1995) Disposal of Lead-Contaminated Surface Preparation Debris
SSPC QP 1	(1989) Evaluating Qualifications of Painting Contractors (Field Application to Complex Structures)
SSPC PA 1	(2000) Shop, Field, and Maintenance Painting
SSPC PA 3	(1995) Safety in Paint Application
SSPC VIS 1	(1989) Visual Standard for Abrasive Blast Cleaned Steel (Standard Reference Photographs)
SSPC VIS 3	(1993) Visual Standard for Power- and Hand-Tool Cleaned Steel (Standard Reference Photographs)
SSPC VIS 4	(2001) Guide and Reference Photographs for Steel Surfaces Prepared by Waterjetting
SSPC SP 1	(1982) Solvent Cleaning
SSPC SP 2	(1995) Hand Tool Cleaning
SSPC SP 3	(1995) Power Tool Cleaning
SSPC SP 6	(1994) Commercial Blast Cleaning
SSPC SP 7	(1994) Brush-Off Blast Cleaning
SSPC SP 10	(1994) Near-White Blast Cleaning
SSPC SP 12	(1995) Surface Preparation and Cleaning of Steel and Other Hard Materials by High-and Ultra high-Pressure Water Jetting Prior to Recoating
SSPC Paint 18	(1991) Chlorinated Rubber Intermediate Coat Paint

1.2 SUBMITTALS

THOMSON ELEMENTARY SCHOOL
RENOVATION AND ADDITION

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only or as otherwise designated. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

The current MPI, "Approved Product List" which lists paint by brand, label, product name and product code as of the date of contract award, will be used to determine compliance with the submittal requirements of this specification. The Contractor may choose to use a subsequent MPI "Approved Product List", however, only one list may be used for the entire contract and each coating system is to be from a single manufacturer. All coats on a particular substrate must be from a single manufacturer. No variation from the MPI Approved Products List is acceptable.

Samples of specified materials may be taken and tested for compliance with specification requirements.

In keeping with the intent of Executive Order 13101, "Greening the Government through Waste Prevention, Recycling, and Federal Acquisition", products certified by SCS as meeting SCS-EPP-SP01-01 shall be given preferential consideration over registered products. Products that are registered shall be given preferential consideration over products not carrying any EPP designation.

SD-02 Shop Drawings

Piping identification

Submit color stencil codes

SD-03 Product Data

Coating

Manufacturer's Technical Data Sheets

Sealant

SD-04 Samples

Color

Submit manufacturer's samples of paint colors. Cross reference color samples to color scheme as indicated in Color Schedule.

SD-07 Certificates

Applicator's qualifications

Qualification Testing laboratory for coatings

SD-08 Manufacturer's Instructions

Application instructions

Mixing

Detailed mixing instructions, minimum and maximum application temperature and humidity, potlife, and curing and drying times between coats.

Manufacturer's Material Safety Data Sheets

Submit manufacturer's Material Safety Data Sheets for coatings, solvents, and other potentially hazardous materials, as defined in FED-STD-313.

SD-10 Operation and Maintenance Data

Coatings:

Preprinted cleaning and maintenance instructions for all coating systems shall be provided.

1.3 APPLICATOR'S QUALIFICATIONS

1.3.1 Contractor Qualification

Submit the name, address, telephone number, FAX number, and e-mail address of the contractor that will be performing all surface preparation and coating application. Submit evidence that key personnel have successfully performed surface preparation and application of coatings on a minimum of three similar projects within the past three years. List information by individual and include the following:

- a. Name of individual and proposed position for this work.
- b. Information about each previous assignment including:

Position or responsibility

Employer (if other than the Contractor)

Name of facility owner

Mailing address, telephone number, and telex number (if non-US) of facility owner

Name of individual in facility owner's organization who can be contacted as a reference

Location, size and description of structure

Dates work was carried out

Description of work carried out on structure

1.3.2 SSPC QP 1 Certification

All contractors and subcontractors that perform surface preparation or coating application shall be certified by the Society for Protective Coatings (formerly Steel Structures Painting Council) (SSPC) to the requirements of SSPC QP 1 prior to contract award, and shall remain certified while accomplishing any surface preparation or coating application. The painting contractors and painting subcontractors must remain so certified for the duration of the project. If a contractor's or subcontractor's certification expires, the firm will not be allowed to

perform any work until the certification is reissued. Requests for extension of time for any delay to the completion of the project due to an inactive certification will not be considered and liquidated damages will apply. Notify the Contracting Officer of any change in contractor certification status.

1.4 QUALITY ASSURANCE

1.4.1 Field Samples and Tests

The Contracting Officer may choose up to two coatings that have been delivered to the site to be tested at no cost to the Government. Take samples of each chosen product as specified in the paragraph "Sampling Procedures." Test each chosen product as specified in the paragraph "Testing Procedure." Products which do not conform, shall be removed from the job site and replaced with new products that conform to the referenced specification. Testing of replacement products that failed initial testing shall be at no cost to the Government.

1.4.1.1 Sampling Procedure

The Contracting Officer will select paint at random from the products that have been delivered to the job site for sample testing. The Contractor shall provide one quart samples of the selected paint materials. The samples shall be taken in the presence of the Contracting Officer, and labeled, identifying each sample. Provide labels in accordance with the paragraph "Packaging, Labeling, and Storage" of this specification.

1.4.1.2 Testing Procedure

Provide Batch Quality Conformance Testing for specified products, as defined by and performed by MPI. As an alternative to Batch Quality Conformance Testing, the Contractor may provide Qualification Testing for specified products above to the appropriate MPI product specification, using the third-party laboratory approved under the paragraph "Qualification Testing" laboratory for coatings. The qualification testing lab report shall include the backup data and summary of the test results. The summary shall list all of the reference specification requirements and the result of each test. The summary shall clearly indicate whether the tested paint meets each test requirement. Note that Qualification Testing may take 4 to 6 weeks to perform, due to the extent of testing required.

Submit name, address, telephone number, FAX number, and e-mail address of the independent third party laboratory selected to perform testing of coating samples for compliance with specification requirements. Submit documentation that laboratory is regularly engaged in testing of paint samples for conformance with specifications, and that employees performing testing are qualified. If the Contractor chooses MPI to perform the Batch Quality Conformance testing, the above submittal information is not required, only a letter is required from the Contractor stating that MPI will perform the testing.

1.5 REGULATORY REQUIREMENTS

1.5.1 Environmental Protection

In addition to requirements specified elsewhere for environmental protection, provide coating materials that conform to the restrictions of the local Air Pollution Control District and regional jurisdiction. Notify Contracting Officer of any paint specified herein which fails to conform.

1.5.2 Lead Content

Do not use coatings having a lead content over 0.06 percent by weight of nonvolatile content.

1.5.3 Chromate Content

Do not use coatings containing zinc-chromate or strontium-chromate.

1.5.4 Asbestos Content

Materials shall not contain asbestos.

1.5.5 Mercury Content

Materials shall not contain mercury or mercury compounds.

1.5.6 Silica

Abrasive blast media shall not contain free crystalline silica.

1.5.7 Human Carcinogens

Materials shall not contain ACGIH Limit Values and ACGIH TLV-DOC confirmed human carcinogens (A1) or suspected human carcinogens (A2).

1.6 PACKAGING, LABELING, AND STORAGE

Paints shall be in sealed containers that legibly show the contract specification number, designation name, formula or specification number, batch number, color, quantity, date of manufacture, manufacturer's formulation number, manufacturer's directions including any warnings and special precautions, and name and address of manufacturer. Pigmented paints shall be furnished in containers not larger than 5 gallons. Paints and thinners shall be stored in accordance with the manufacturer's written directions, and as a minimum, stored off the ground, under cover, with sufficient ventilation to prevent the buildup of flammable vapors, and at temperatures between 40 to 95 degrees F.

1.7 SAFETY AND HEALTH

Apply coating materials using safety methods and equipment in accordance with the following:

Work shall comply with applicable Federal, State, and local laws and regulations, and with the ACCIDENT PREVENTION PLAN, including the Activity Hazard Analysis as specified in Section 01525, "Safety Requirements" and in Appendix A of EM 385-1-1. The Activity Hazard Analysis shall include analyses of the potential impact of painting operations on painting personnel and on others involved in and adjacent to the work zone.

1.7.1 Safety Methods Used During Coating Application

Comply with the requirements of SSPC PA 3.

1.7.2 Toxic Materials

To protect personnel from overexposure to toxic materials, conform to the most stringent guidance of:

- a. The applicable manufacturer's Material Safety Data Sheets (MSDS) or local regulation.
- b. 29 CFR 1910.1000.
- c. ACGIH Limit Values, threshold limit values.

1.8 ENVIRONMENTAL CONDITIONS

1.8.1 Coatings

Do not apply coating when air or substrate conditions are:

- a. Less than 5 degrees F above dew point;
- b. Below 50 degrees F or over 95 degrees F, unless specifically pre-approved by the Contracting Officer and the product manufacturer. Under no circumstances shall application conditions exceed manufacturer recommendations.

1.9 LOCATION AND SURFACE TYPE TO BE PAINTED

1.9.1 Painting Included

Where a space or surface is indicated to be painted, include the following unless indicated otherwise.

- a. Surfaces behind portable objects and surface mounted articles readily detachable by removal of fasteners, such as screws and bolts.

1.9.1.1 Exterior Painting

Includes new surfaces and appurtenances as indicated. Also included are existing coated surfaces made bare by cleaning operations.

1.9.1.2 Interior Painting

Includes new surfaces and appurtenances as indicated and existing coated surfaces made bare by cleaning operations. Where a space or surface is indicated to be painted, include the following items, unless indicated otherwise.

- a. Exposed columns, girders, beams, joists, and metal deck; and
- b. Other contiguous surfaces.

1.9.2 Painting Excluded

Do not paint the following unless indicated otherwise.

- a. Surfaces concealed and made inaccessible by panelboards, fixed ductwork, machinery, and equipment fixed in place.
- b. Surfaces in concealed spaces. Concealed spaces are defined as enclosed spaces above suspended ceilings, furred spaces, attic spaces, elevator shafts and chases.
- c. Steel to be embedded in concrete.
- d. Copper, stainless steel, aluminum, brass, and lead except existing coated surfaces.
- e. Hardware, fittings, and other factory finished items.

1.9.3 Mechanical and Electrical Painting

Includes field coating of interior new surfaces.

- a. Where a space or surface is indicated to be painted, include the following items unless indicated otherwise.
 - (1) Exposed piping, conduit, and ductwork;
 - (2) Supports, hangers, air grilles, and registers;
 - (3) Miscellaneous metalwork and insulation coverings.
- b. Do not paint the following, unless indicated otherwise:
 - (1) New zinc-coated, aluminum, and copper surfaces under insulation
 - (2) New aluminum jacket on piping
 - (3) New interior ferrous piping under insulation.

1.9.4 Exterior Painting of Site Work Items

Field coat the following items:

New Surfaces

- a. Parking striping
- b. Curbs
- c. Site Furniture

1.9.5 MISCELLANEOUS PAINTING

Lettering Room Number(s)

Lettering shall be provided as scheduled on the drawings, shall be block type, and shall be black enamel. Samples shall be approved before

application.

1.9.6 Definitions and Abbreviations

1.9.6.1 Qualification Testing

Qualification testing is the performance of all test requirements listed in the product specification. This testing is accomplished by MPI to qualify each product for the MPI Approved Product List, and may also be accomplished by Contractor's third party testing lab if an alternative to Batch Quality Conformance Testing by MPI is desired.

1.9.6.2 Batch Quality Conformance Testing

Batch quality conformance testing determines that the product provided is the same as the product qualified to the appropriate product specification. This testing shall only be accomplished by MPI testing lab.

1.9.6.3 Coating

A film or thin layer applied to a base material called a substrate. A coating may be a metal, alloy, paint, or solid/liquid suspensions on various substrates (metals, plastics, wood, paper, leather, cloth, etc.). They may be applied by electrolysis, vapor deposition, vacuum, or mechanical means such as brushing, spraying, calendering, and roller coating. A coating may be applied for aesthetic or protective purposes or both. The term "coating" as used herein includes emulsions, enamels, stains, varnishes, sealers, epoxies, and other coatings, whether used as primer, intermediate, or finish coat. The terms paint and coating are used interchangeably.

1.9.6.4 DFT or dft

Dry film thickness, the film thickness of the fully cured, dry paint or coating.

1.9.6.5 DSD

Degree of Surface Degradation, the MPI system of defining degree of surface degradation. Five (5) levels are generically defined under the Assessment sections in the MPI Maintenance Repainting Manual.

1.9.6.6 EPP

Environmentally Preferred Products, a standard for determining environmental preferability in support of Executive Order 13101.

1.9.6.7 EXT

MPI short term designation for an exterior coating system.

1.9.6.8 INT

MPI short term designation for an interior coating system.

1.9.6.9 micron / microns

The metric measurement for 0.001 mm or one/one-thousandth of a millimeter.

1.9.6.10 mil / mils

The English measurement for 0.001 in or one/one-thousandth of an inch, equal to 25.4 microns or 0.0254 mm.

1.9.6.11 mm

The metric measurement for millimeter, 0.001 meter or one/one-thousandth of a meter.

1.9.6.12 MPI Gloss Levels

MPI system of defining gloss. Seven (7) gloss levels (G1 to G7) are generically defined under the Evaluation sections of the MPI Manuals. Traditionally, Flat refers to G1/G2, Eggshell refers to G3, Semigloss refers to G5, and Gloss refers to G6.

Gloss levels are defined by MPI as follows:

Gloss Level	Description	Units @ 60 degrees	Units @ 85 degrees
G1	Matte or Flat	0 to 5	10 max
G2	Velvet	0 to 10	10 to 35
G3	Eggshell	10 to 25	10 to 35
G4	Satin	20 to 35	35 min
G5	Semi-Gloss	35 to 70	
G6	Gloss	70 to 85	
G7	High Gloss		

Gloss is tested in accordance with ASTM D 523. Historically, the Government has used Flat (G1 / G2), Eggshell (G3), Semi-Gloss (G5), and Gloss (G6).

1.9.6.13 MPI System Number

The MPI coating system number in each Division found in either the MPI Architectural Painting Specification Manual or the Maintenance Repainting Manual and defined as an exterior (EXT/REX) or interior system (INT/RIN). The Division number follows the CSI Master Format.

1.9.6.14 Paint

See Coating definition.

1.9.6.15 REX

MPI short term designation for an exterior coating system used in repainting projects or over existing coating systems.

1.9.6.16 RIN

MPI short term designation for an interior coating system used in repainting projects or over existing coating systems.

PART 2 PRODUCTS

2.1 MATERIALS

Conform to the coating specifications and standards referenced in PART 3. Submit manufacturer's technical data sheets for specified coatings and solvents.

PART 3 EXECUTION

3.1 PROTECTION OF AREAS AND SPACES NOT TO BE PAINTED

Prior to surface preparation and coating applications, remove, mask, or otherwise protect, hardware, hardware accessories, machined surfaces, radiator covers, plates, lighting fixtures, public and private property, and other such items not to be coated that are in contact with surfaces to be coated. Following completion of painting, workmen skilled in the trades involved shall reinstall removed items. Restore surfaces contaminated by coating materials, to original condition and repair damaged items.

3.2 SURFACE PREPARATION

Remove dirt, splinters, loose particles, grease, oil, and other foreign matter and substances deleterious to coating performance as specified for each substrate before application of paint or surface treatments. Oil and grease shall be removed prior to mechanical cleaning. Cleaning shall be programmed so that dust and other contaminants will not fall on wet, newly painted surfaces. Exposed ferrous metals such as nail heads on or in contact with surfaces to be painted with water-thinned paints, shall be spot-primed with a suitable corrosion-inhibitive primer capable of preventing flash rusting and compatible with the coating specified for the adjacent areas.

3.2.1 Substrate Repair

- a. Repair substrate surface damaged during coating removal;
- b. Clean and prime the substrate as specified.

3.3 PREPARATION OF METAL SURFACES

3.3.1 Existing and New Ferrous Surfaces

- a. Ferrous Surfaces including Shop-coated Surfaces and Small Areas That Contain Rust, Mill Scale and Other Foreign Substances: Solvent clean or detergent wash in accordance with SSPC SP 1 to remove oil and grease. Where shop coat is missing or damaged, clean according to SSPC SP 2. Brush-off blast remaining surface in accordance with SSPC SP 7; Shop-coated ferrous surfaces shall be protected from corrosion by treating and touching up corroded areas immediately upon detection.
- b. Surfaces With More Than 20 Percent Rust, Mill Scale, and Other Foreign Substances: Clean entire surface in accordance with SSPC SP 6/SSPC SP 12 WJ-3.

3.3.2 Final Ferrous Surface Condition:

For tool cleaned surfaces, the requirements are stated in SSPC SP 2 and SSPC SP 3. As a visual reference, cleaned surfaces shall be similar to

photographs in SSPC VIS 3.

For abrasive blast cleaned surfaces, the requirements are stated in SSPC SP 7, SSPC SP 6, and SSPC SP 10. As a visual reference, cleaned surfaces shall be similar to photographs in SSPC VIS 1.

For waterjet cleaned surfaces, the requirements are stated in SSPC SP 12. As a visual reference, cleaned surfaces shall be similar to photographs in SSPC VIS 4.

3.3.3 Galvanized Surfaces

- a. New or Existing Galvanized Surfaces With Only Dirt and Zinc Oxidation Products: Clean with solvent, steam, or non-alkaline detergent solution in accordance with SSPC SP 1. If the galvanized metal has been passivated or stabilized, the coating shall be completely removed by brush-off abrasive blast. New galvanized steel to be coated shall not be "passivated" or "stabilized" If the absence of hexavalent stain inhibitors is not documented, test as described in ASTM D 2092, Appendix X2, and remove by one of the methods described therein.

3.3.4 Non-Ferrous Metallic Surfaces

Aluminum and aluminum-alloy, lead, copper, and other nonferrous metal surfaces.

- a. Surface Cleaning: Solvent clean in accordance with SSPC SP 1 and wash with mild non-alkaline detergent to remove dirt and water soluble contaminants.

3.4 PREPARATION OF CONCRETE AND CEMENTITIOUS SURFACE

3.4.1 Concrete and Masonry

- a. Curing: Concrete, stucco and masonry surfaces shall be allowed to cure at least 30 days before painting, except concrete slab on grade, which shall be allowed to cure 90 days before painting.

- b. Surface Cleaning: Remove the following deleterious substances.

(1) Dirt, Chalking, Grease, and Oil: Wash new surfaces with a solution composed of 1/2 cup trisodium phosphate, 1/4 cup household detergent, and 4 quarts of warm water. Then rinse thoroughly with fresh water. Wash existing surfaces with potable water. For large areas, water blasting may be used.

(2) Fungus and Mold: Wash new surfaces with a solution composed of 1/2 cup trisodium phosphate, 1/4 cup household detergent, 1 quart 5 percent sodium hypochlorite solution and 3 quarts of warm water. Rinse thoroughly with fresh water.

(3) Paint and Loose Particles: Remove by wire brushing.

(4) Efflorescence: Remove by scraping or wire brushing followed by washing with a 5 to 10 percent by weight aqueous solution of

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hydrochloric (muriatic) acid. Do not allow acid to remain on the surface for more than five minutes before rinsing with fresh water. Do not acid clean more than 4 square feet of surface, per workman, at one time.

- c. Cosmetic Repair of Minor Defects: Repair or fill mortar joints and minor defects, including but not limited to spalls, in accordance with manufacturer's recommendations and prior to coating application.
- d. Allowable Moisture Content: Latex coatings may be applied to damp surfaces, but not to surfaces with droplets of water. Do not apply epoxies to damp vertical surfaces as determined by ASTM D 4263 or horizontal surfaces that exceed 3 lbs of moisture per 1000 square feet in 24 hours as determined by ASTM F 1869. In all cases follow manufacturers recommendations. Allow surfaces to cure a minimum of 30 days before painting.

3.4.2 Gypsum Board

- a. Surface Cleaning: Plaster and stucco shall be clean and free from loose matter; gypsum board shall be dry. Remove loose dirt and dust by brushing with a soft brush, rubbing with a dry cloth, or vacuum-cleaning prior to application of the first coat material. A damp cloth or sponge may be used if paint will be water-based.
- b. Repair of Minor Defects: Prior to painting, repair joints, cracks, holes, surface irregularities, and other minor defects with patching plaster or spackling compound and sand smooth.
- c. Allowable Moisture Content: Latex coatings may be applied to damp surfaces, but not surfaces with droplets of water. Do not apply epoxies to damp surfaces as determined by ASTM D 4263. New plaster to be coated shall have a maximum moisture content of 8 percent, when measured in accordance with ASTM D 4444, Method A, unless otherwise authorized. In addition to moisture content requirements, allow new plaster to age a minimum of 30 days before preparation for painting.

3.5 PREPARATION OF WOOD AND PLYWOOD SURFACES

3.5.1 New Plywood and Wood Surfaces, Except Floors:

- a. Wood surfaces shall be cleaned of foreign matter.

Surface Cleaning: Surfaces shall be free from dust and other deleterious substances and in a condition approved by the Contracting Officer prior to receiving paint or other finish. Do not use water to clean uncoated wood.
- b. Removal of Fungus and Mold: Wash existing coated surfaces with a solution composed of 3 ounces (2/3 cup) trisodium phosphate, 1 ounce (1/3 cup) household detergent, 1 quart 5 percent sodium hypochlorite solution and 3 quarts of warm water. Rinse thoroughly with fresh water.
- c. Moisture content of the wood shall not exceed 12 percent as measured by a moisture meter in accordance with ASTM D 4444,

Method A, unless otherwise authorized.

- d. Wood surfaces adjacent to surfaces to receive water-thinned paints shall be primed and/or touched up before applying water-thinned paints.
- e. Cracks and Nailheads: Set and putty stop nailheads and putty cracks after the prime coat has dried.
- f. Cosmetic Repair of Minor Defects:
 - (1) Knots and Resinous Wood and Fire, Smoke, Water, and Color Marker Stained Existing Coated Surface: Prior to application of coating, cover knots and stains with two or more coats of 3-pound-cut shellac varnish, plasticized with 5 ounces of castor oil per gallon. Scrape away existing coatings from knotty areas, and sand before treating. Prime before applying any putty over shellacked area.
 - (2) Open Joints and Other Openings: Fill with whiting putty, linseed oil putty. Sand smooth after putty has dried.
 - (3) Checking: Where checking of the wood is present, sand the surface, wipe and apply a coat of pigmented orange shellac. Allow to dry before paint is applied.
- g. Prime Coat For New Exterior Surfaces: Prime coat wood doors, and trim before wood becomes dirty, or warped.

3.5.2 Wood Floor Surfaces, Natural Finish

- a. Initial Surface Cleaning: As specified in paragraph entitled "Surface Preparation."
- c. Sanding and Scraping: Sanding of wood floors is specified in Section 09640A WOOD STRIP FLOORING. Floors of oak or similar open-grain wood shall be filled with wood filler recommended by the finish manufacturer and the excess filler removed.
- d. Final Cleaning: After sanding, sweep and vacuum floors clean. Do not walk on floors thereafter until specified sealer has been applied and is dry.

3.5.3 Interior Wood Surfaces, Stain Finish

Interior wood surfaces to receive stain shall be sanded. Oak and other open-grain wood to receive stain shall be given a coat of wood filler not less than 8 hours before the application of stain; excess filler shall be removed and the surface sanded smooth.

3.6 APPLICATION

3.6.1 Coating Application

Painting practices shall comply with applicable federal, state and local laws enacted to insure compliance with Federal Clean Air Standards. Apply coating materials in accordance with SSPC PA 1. SSPC PA 1 methods are applicable to all substrates, except as modified herein.

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At the time of application, paint shall show no signs of deterioration. Uniform suspension of pigments shall be maintained during application.

Unless otherwise specified or recommended by the paint manufacturer, paint may be applied by brush, roller, or spray. Rollers for applying paints and enamels shall be of a type designed for the coating to be applied and the surface to be coated.

Paints, except water-thinned types, shall be applied only to surfaces that are completely free of moisture as determined by sight or touch.

Thoroughly work coating materials into joints, crevices, and open spaces. Special attention shall be given to insure that all edges, corners, crevices, welds, and rivets receive a film thickness equal to that of adjacent painted surfaces.

Each coat of paint shall be applied so dry film shall be of uniform thickness and free from runs, drops, ridges, waves, pinholes or other voids, laps, brush marks, and variations in color, texture, and finish. Hiding shall be complete.

Touch up damaged coatings before applying subsequent coats. Interior areas shall be broom clean and dust free before and during the application of coating material.

- a. Drying Time: Allow time between coats, as recommended by the coating manufacturer, to permit thorough drying, but not to present topcoat adhesion problems. Provide each coat in specified condition to receive next coat.
- b. Primers, and Intermediate Coats: Do not allow primers or intermediate coats to dry more than 30 days, or longer than recommended by manufacturer, before applying subsequent coats. Follow manufacturer's recommendations for surface preparation if primers or intermediate coats are allowed to dry longer than recommended by manufacturers of subsequent coatings. Each coat shall cover surface of preceding coat or surface completely, and there shall be a visually perceptible difference in shades of successive coats.
- c. Finished Surfaces: Provide finished surfaces free from runs, drops, ridges, waves, laps, brush marks, and variations in colors.
- d. Thermosetting Paints: Topcoats over thermosetting paints (epoxies and urethanes) should be applied within the overcoating window recommended by the manufacturer.
- e. Floors: For nonslip surfacing on level floors, as the intermediate coat is applied, cover wet surface completely with almandite garnet, Grit No. 36, with maximum passing U.S. Standard Sieve No. 40 less than 0.5 percent. When the coating is dry, use a soft bristle broom to sweep up excess grit, which may be reused, and vacuum up remaining residue before application of the topcoat. For nonslip surfacing on ramps, provide MPI 77 with non-skid additive, applied by roller in accordance with manufacturer's instructions.

3.6.2 Mixing

Reduce paints to proper consistency by adding fresh paint, except when thinning is mandatory to suit surface, temperature, weather conditions, application methods, or for the type of paint being used. Obtain written permission from the Contracting Officer to use thinners. The written permission shall include quantities and types of thinners to use.

3.6.3 Two-Component Systems

Two-component systems shall be mixed in accordance with manufacturer's instructions. Any thinning of the first coat to ensure proper penetration and sealing shall be as recommended by the manufacturer for each type of substrate.

3.6.4 Coating Systems

- a. Systems by Substrates: Apply coatings that conform to the respective specifications listed in the following Tables:

Table

Division 3.	Exterior/Interior Concrete Paint Table
Division 4.	Exterior/Interior Concrete Masonry Units Paint Table
Division 5.	Exterior Metal, Ferrous and Non-Ferrous Paint Table
Division 6.	Exterior Wood; Dressed Lumber, Paneling, Decking, Shingles Paint; Interior Wood Paint Table
Division 9.	Exterior Stucco Paint Table
Division 10.	Exterior Cloth Coverings and Bituminous Coated Surfaces Paint Table; Interior Plaster, Gypsum Board, Textured Surfaces Paint Table

- b. Minimum Dry Film Thickness (DFT): Apply paints, primers, varnishes, enamels, undercoats, and other coatings to a minimum dry film thickness of 1.5 mil each coat unless specified otherwise in the Tables. Coating thickness where specified, refers to the minimum dry film thickness.
- c. Coatings for Surfaces Not Specified Otherwise: Coat surfaces which have not been specified, the same as surfaces having similar conditions of exposure.
- d. Existing Surfaces Damaged During Performance of the Work, Including New Patches In Existing Surfaces: Coat surfaces with the following:
 - (1) One coat of primer.
 - (2) One coat of undercoat or intermediate coat.
 - (3) One topcoat to match adjacent surfaces.

3.7 COATING SYSTEMS FOR METAL

Apply coatings of Tables in Division 5 for Exterior and Interior.

- a. Apply specified ferrous metal primer on the same day that surface is cleaned, to surfaces that meet all specified surface

preparation requirements at time of application.

- b. Inaccessible Surfaces: Prior to erection, use one coat of specified primer on metal surfaces that will be inaccessible after erection.
- c. Shop-primed Surfaces: Touch up exposed substrates and damaged coatings to protect from rusting prior to applying field primer.
- d. Surface Previously Coated with Epoxy or Urethane: Apply MPI 101, 1.5 mils DFT immediately prior to application of epoxy or urethane coatings.
- e. Pipes and Tubing: The semitransparent film applied to some pipes and tubing at the mill is not to be considered a shop coat, but shall be overcoated with the specified ferrous-metal primer prior to application of finish coats.
- f. Exposed Nails, Screws, Fasteners, and Miscellaneous Ferrous Surfaces. On surfaces to be coated with water thinned coatings, spot prime exposed nails and other ferrous metal with latex primer MPI 107.

3.8 COATING SYSTEMS FOR CONCRETE AND CEMENTITIOUS SUBSTRATES

Apply coatings of Tables in Division 3, 4 and 9 for Exterior and Interior.

3.9 COATING SYSTEMS FOR WOOD AND PLYWOOD

- a. Apply coatings of Tables in Division 6 for Exterior and Interior.
- b. Prior to erection, apply two coats of specified primer to treat and prime wood and plywood surfaces which will be inaccessible after erection.
- c. Apply stains in accordance with manufacturer's printed instructions.
- d. Wood Floors to Receive Natural Finish: Thin first coat 2 to 1 using thinner recommended by coating manufacturer. Apply all coatings at rate of 300 to 350 square feet per gallon. Apply second coat not less than 2 hours and not over 24 hours after first coat has been applied. Apply with lambs wool applicators or roller as recommended by coating manufacturer. Buff or lightly sand between intermediate coats as recommended by coating manufacturer's printed instructions.

3.10 PIPING IDENTIFICATION

Piping Identification, Including Surfaces In Concealed Spaces: Provide in accordance with MIL-STD-101ANSI A13.1. Place stenciling in clearly visible locations. On piping not covered by MIL-STD-101ANSI A13.1, stencil approved names or code letters, in letters a minimum of 1/2 inch high for piping and a minimum of 2 inches high elsewhere. Stencil arrow-shaped markings on piping to indicate direction of flow using black stencil paint.

3.11 INSPECTION AND ACCEPTANCE

In addition to meeting previously specified requirements, demonstrate

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mobility of moving components, including swinging and sliding doors, cabinets, and windows with operable sash, for inspection by the Contracting Officer. Perform this demonstration after appropriate curing and drying times of coatings have elapsed and prior to invoicing for final payment.

3.12 PAINT TABLES

All DFT's are minimum values.

3.12.1 EXTERIOR PAINT TABLES

DIVISION 3: EXTERIOR CONCRETE PAINT TABLE

- A. New and uncoated existing and Existing, previously painted concrete; vertical surfaces, including undersides of balconies and soffits but excluding tops of slabs:

1. Latex

New; MPI EXT 3.1A-G5 (Semigloss) / Existing; MPI EXT 3.1A-G5 (Semigloss)		
Primer:	Intermediate:	Topcoat:
MPI 11	MPI 11	MPI 11
System DFT:	3.5 mils	

Primer as recommended by manufacturer. Topcoat: Coating to match adjacent surfaces.

DIVISION 4: EXTERIOR CONCRETE MASONRY UNITS PAINT TABLE

- A. New concrete masonry on uncoated surface:

1. Latex

New; MPI EXT 4.2A-G5 (Semigloss) / Existing; MPI REX 4.2A-G5 (Semigloss)			
Block Filler:	Primer:	Intermediate:	Topcoat:
MPI 4	N/A	MPI 11	MPI 11
System DFT:	11 mils		

Topcoat: Coating to match adjacent surfaces.

DIVISION 5: EXTERIOR METAL, FERROUS AND NON-FERROUS PAINT TABLE

STEEL / FERROUS SURFACES

- A. New Steel that has been hand or power tool cleaned to SSPC SP 2 or SSPC SP 3

1. Alkyd

New; MPI EXT 5.1Q-G5 (Semigloss) Existing; MPI REX 5.1D-G5		
Primer:	Intermediate:	Topcoat:
MPI 23	MPI 94	MPI 94
System DFT:	5.25 mils	

- B. New Steel that has been blast-cleaned to SSPC SP 6:

2. Alkyd

New; MPI EXT 5.1D-G5 (Semigloss) / Existing; MPI REX 5.1D-G5

STEEL / FERROUS SURFACES

Primer:	Intermediate:	Topcoat:
MPI 79	MPI 94	MPI 94
System DFT: 5.25 mils		

- C. Metal floors (non-shop-primed surfaces or non-slip deck surfaces) with non-skid additive (NSA), load at manufacturer's recommendations.:

1. Alkyd Floor Enamel

MPI EXT 5.1S-G6 (Gloss)

Primer:	Intermediate:	Topcoat:
MPI 79	MPI 27	MPI 27 (+NSA)
System DFT: 5.25 mils		

EXTERIOR GALVANIZED SURFACES

- D. New Galvanized surfaces:

1. Waterborne Primer / Latex

MPI EXT 5.3H-G5 (Semigloss)

Primer:	Intermediate:	Topcoat:
MPI 134	MPI 11	MPI 11
System DFT: 4.5 mils		

EXTERIOR SURFACES, OTHER METALS (NON-FERROUS)

- E. Aluminum, aluminum alloy and other miscellaneous non-ferrous metal items not otherwise specified except hot metal surfaces, roof surfaces, and new prefinished equipment. Match surrounding finish:

1. Alkyd

MPI EXT 5.4F-G5 (Semigloss)

Primer:	Intermediate:	Topcoat:
MPI 95	MPI 94	MPI 94
System DFT: 5 mils		

- F. Hot metal surfaces including smokestacks subject to temperatures up to 205 degrees C (400 degrees F):

1. Heat Resistant Enamel

MPI EXT 5.2A

Primer:	Intermediate:	Topcoat:
MPI 21	Surface preparation and number of coats per manufacturer's instructions.	
System DFT: Per Manufacturer		

- G. Ferrous metal subject to high temperature, up to 400 degrees C (750 degrees F):

1. Heat Resistant Aluminum Enamel

MPI EXT 5.2B (Aluminum Finish)

Primer:	Intermediate:	Topcoat:
MPI 2	Surface preparation and number of coats per manufacturer's instructions.	
System DFT: Per Manufacturer		

DIVISION 6: EXTERIOR WOOD; DRESSED LUMBER

A. New Dressed lumber:

1. Latex

MPI EXT 6.3A-G5 (Semigloss)
Primer: Intermediate: Topcoat:
MPI 7 MPI 11 MPI 11
System DFT: 5 mils

DIVISION 9: EXTERIOR STUCCO PAINT TABLE

A. New EIFS when not supplied with integral pigmentation:

1. Latex

New; MPI EXT 9.1A-G5 (Semigloss) / Existing; MPI REX 9.1A-G5 (Semigloss)
Primer: Intermediate: Topcoat:
MPI 11 MPI 11 MPI 11
System DFT: 4.5 mils

Primer as recommended by manufacturer. Topcoat: Coating to match adjacent surfaces.

3.12.2 INTERIOR PAINT TABLES

DIVISION 3: INTERIOR CONCRETE PAINT TABLE

A. Concrete, vertical surfaces, not specified otherwise:

1. New; MPI INT 3.1A-G5 (Semigloss) / Existing; MPI RIN 3.1A-G5 (Semigloss)
Primer: Intermediate: Topcoat:
MPI 50 MPI 54 MPI 54
System DFT: 4 mils]

B. Concrete in toilets, food-preparation, food-serving, and restrooms except floors:

1. Epoxy

New; MPI INT 3.1F-G6 (Gloss) / Existing; MPI RIN 3.1E-G6 (Gloss)
Primer: Intermediate: Topcoat:
MPI 77 MPI 77 MPI 77
System DFT: 4 mils

Note: Primer may be reduced for penetration per manufacturer's instructions.

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DIVISION 4: INTERIOR CONCRETE MASONRY UNITS PAINT TABLE

A. New concrete masonry:

1. High Performance Architectural Latex

MPI INT 4.2D-G5 (Semigloss)

Filler	Primer:	Intermediate:	Topcoat:
MPI 4	N/A	MPI 141	MPI 141

System DFT: 11 mils

Fill all holes in masonry surface

B. Existing, previously painted Concrete masonry:

1. High Performance Architectural Latex

MPI RIN 4.2K-G5 (Semigloss)

Spot Primer:	Intermediate:	Topcoat:
MPI 50	MPI 141	MPI 141

System DFT: 4.5 mils

C. New concrete masonry units in toilets, food-preparation, food-serving, and restrooms:

1. Epoxy

MPI INT 4.2G-G6 (Gloss)

Filler:	Primer:	Intermediate:	Topcoat:
MPI 116	N/A	MPI 77	MPI 77

System DFT: 10 mils

Fill all holes in masonry surface

D. Existing, previously painted, concrete masonry units in toilets, food-preparation, food-serving, and restrooms:

1. Epoxy

MPI RIN 4.2D-G6 (Gloss)

Spot Primer:	Intermediate:	Topcoat:
MPI 77	MPI 77	MPI 77

System DFT: 5 mils

DIVISION 5: INTERIOR METAL, FERROUS AND NON-FERROUS PAINT TABLE

INTERIOR STEEL / FERROUS SURFACES

A. Metal, Mechanical, Electrical, Fire extinguishing sprinkler systems including valves, conduit, hangers, supports,

and

miscellaneous metal items not otherwise specified except floors, hot metal surfaces, and new prefinished equipment:

1. Alkyd

MPI INT 5.1E-G5 (Semigloss)

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INTERIOR STEEL / FERROUS SURFACES

Primer:	Intermediate:	Topcoat:
MPI 79	MPI 47	MPI 47
System DFT: 5.25 mils		

B. Metal floors (non-shop-primed surfaces or non-slip deck surfaces) with non-skid additive (NSA), load at manufacturer's recommendations.:

1. Epoxy

MPI INT 5.1L-G6 (Gloss)		
Primer:	Intermediate:	Topcoat:
MPI 101	MPI 77	MPI 77 (+NSA)
System DFT: 5.25 mils		

C. Metal in toilets, food-preparation, food-serving, and restrooms, except hot metal surfaces, and new prefinished equipment:

1. Alkyd

MPI INT 5.1E-G5 (Semigloss)		
Primer:	Intermediate:	Topcoat:
MPI 79	MPI 47	MPI 47
System DFT: 5.25 mils		

D. Miscellaneous non-ferrous metal items not otherwise specified except floors, hot metal surfaces, and new prefinished equipment. Match surrounding finish:

1. High Performance Architectural Latex

MPI INT 5.4F-G5 (Semigloss)		
Primer:	Intermediate:	Topcoat:
MPI 95	MPI 141	MPI 141
System DFT: 5 mils		

E. Hot metal surfaces including smokestacks subject to temperatures up to 205 degrees C (400 degrees F):

1. Heat Resistant Enamel

MPI INT 5.2A		
Primer:	Intermediate:	Topcoat:
MPI 21	Surface preparation and number of coats per manufacturer's instructions.	
System DFT: Per Manufacturer		

F. Ferrous metal subject to high temperature, up to 400 degrees C (750 degrees F):

1. Heat Resistant Aluminum Paint

MPI INT 5.2B (Aluminum Finish)		
Primer:	Intermediate:	Topcoat:
MPI 2	Surface preparation and number of coats per manufacturer's instructions.	
System DFT: Per Manufacturer		

DIVISION 6: INTERIOR WOOD PAINT TABLE

A. Wood and plywood not otherwise specified:

1. High Performance Architectural Latex

MPI INT 6.4S-G5 (Semigloss)
Primer: Intermediate: Topcoat:
MPI 39 MPI 141 MPI 141
System DFT: 4.5 mils

B. New Wood, except floors; natural finish or stained:

1. Natural finish, oil-modified polyurethane

New; MPI INT 6.4J-G4 / Existing; MPI RIN 6.4L-G4
Primer: Intermediate: Topcoat:
MPI 57 MPI 57 MPI 57
System DFT: 4 mils

C. New Wood Floors; Natural finish or stained:

1. Natural finish, oil-modified polyurethane

New; MPI INT 6.5C-G6 (Gloss) / Existing; MPI RIN 6.5C-G6 (Gloss)
Primer: Intermediate: Topcoat:
MPI 56 MPI 56 MPI 56
System DFT: 4 mils

2. Stained, Moisture Cured Polyurethane

New; MPI INT 6.5J-G6 (Gloss) / Existing; MPI RIN 6.5L-G6 (Gloss)
Stain: Primer: Intermediate: Topcoat:
MPI 90 MPI 31 MPI 31 MPI 31
System DFT: 4 mils

D. New Wood Doors; Natural Finish or Stained:

1. Natural finish, oil-modified polyurethane

New; MPI INT 6.3K-G4 / Existing; MPI RIN 6.3K-G4
Primer: Intermediate: Topcoat:
MPI 57 MPI 57 MPI 57
System DFT: 4 mils

Note: Sand between all coats per manufacturers recommendations.

DIVISION 9: INTERIOR GYPSUM BOARD, TEXTURED SURFACES PAINT TABLE

A. New and Existing, previously painted Plaster and Wallboard not otherwise specified:

1. Latex

New; MPI INT 9.2A-G5 (Semigloss) / Existing; RIN 9.2A-G5 (Semigloss)
Primer: Intermediate: Topcoat:
MPI 50 MPI 54 MPI 54
System DFT: 4 mils

B. New and Existing, previously painted Plaster a not otherwise

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DIVISION 9: INTERIOR GYPSUM BOARD, TEXTURED SURFACES PAINT TABLE
specified.:

1. Epoxy

New; MPI INT 9.2E-G6 (Gloss) / Existing; MPI RIN 9.2D-G6 (Gloss)

Primer: Intermediate: Topcoat:

MPI 50 MPI 77 MPI 77

System DFT: 4 mils

-- End of Section --

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EXTERIOR SIGNAGE
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PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

ALUMINUM ASSOCIATION (AA)

AA DAF-45 (1997) Designation System for Aluminum Finishes

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI Z97.1 (1984; R 1994) Safety Performance Specifications and Methods of Test for Safety Glazing Materials Used in Buildings

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 36/A 36M (2000) Carbon Structural Steel

ASTM A 123/A 123M (2000) Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

ASTM A 570/A 570M (1998) Steel, Sheet and Strip, Carbon, Hot-Rolled, Structural Quality

ASTM A 653/A 653M (2000) Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process

ASTM A 924/A 924M (1999) General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process

ASTM B 26/B 26M (1999) Aluminum-Alloy Sand Castings

ASTM B 62 (1993) Composition Bronze or Ounce Metal Castings

ASTM B 108 (1999) Aluminum-Alloy Permanent Mold Castings

ASTM B 209 (1996) Aluminum and Aluminum-Alloy Sheet and Plate

ASTM B 209M (2000) Aluminum and Aluminum-Alloy Sheet and Plate (Metric)

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ASTM B 221	(2000) Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes
ASTM B 221M	(2000) Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric)
ASTM C 1036	(1991; R 1997) Flat Glass
ASTM D 3841	(1997) Glass-Fiber-Reinforced Polyester Plastic Panels
ASTM E 84	(2000a) Surface Burning Characteristics of Building Materials

AMERICAN WELDING SOCIETY (AWS)

AWS C1.1M/C1.1	(2000) Recommended Practices for Resistance Welding
AWS D1.1	(2000) Structural Welding Code - Steel
AWS D1.2	(1997) Structural Welding Code - Aluminum

NATIONAL ASSOCIATION OF ARCHITECTURAL METAL MANUFACTURERS (NAAMM)

NAAMM AMP 505	(1988) Metal Finishes Manual for Architectural and Metal Products
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NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	(1999) National Electrical Code
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SOCIETY OF AUTOMOTIVE ENGINEERS INTERNATIONAL (SAE)

SAE AMS 3611	(1994; Rev D) Plastic Sheet, Polycarbonate General Purpose
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1.2 GENERAL

All exterior signage shall be provided by a single manufacturer. Exterior signage shall be of the design, detail, sizes, types, and message content shown on the drawings, shall conform to the requirements specified, and shall be provided at the locations indicated. Signs shall be complete with lettering, framing as detailed, and related components for a complete installation. Recyclable materials shall conform to EPA requirements in accordance with Section 01670 RECYCLED / RECOVERED MATERIALS.

1.3 WIND LOAD REQUIREMENTS

Exterior signage shall be designed to withstand 90 mph windload.

1.4 CHARACTER PROPORTIONS AND HEIGHTS

Letters and numbers on indicated signs for handicapped-accessible buildings shall have a width-to-height ratio between 3:5 and 1:1 and a stroke-width-to-height ratio between 1:5 and 1:10. Characters and numbers on indicated signs shall be sized according to the viewing distance from

which they are to be read. The minimum height is measured using an upper case letter "X". Lower case characters are permitted.

1.5 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only or as otherwise designated. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Approved Detail Drawings

Drawings showing elevations of each type of sign; dimensions, details, and methods of mounting or anchoring; shape and thickness of materials; and details of construction. A schedule showing the location, each sign type, and message shall be included.

SD-03 Product Data

Modular Exterior Signage System

Manufacturer's descriptive data and catalog cuts.

Installation

Manufacturer's installation instructions and cleaning instructions.

Exterior Signs

Exterior signage schedule in electronic media with spread sheet format. Spread sheet shall include sign location, sign type, and message.

Wind Load Requirements

Design analysis and supporting calculations performed in support of specified signage.

SD-04 Samples

Exterior Signs

One sample shall consist of a complete sign panel with letter incorporated in metal cladding. Sample shall be in intended size and color.

SD-10 Operation and Maintenance Data

Protection and Cleaning

1.6 QUALIFICATIONS

Dimensional letters shall be the standard product of a manufacturer

regularly engaged in the manufacture of the products. Items of equipment shall essentially duplicate equipment that has been in satisfactory use at least 2 years prior to bid opening.

1.7 DELIVERY AND STORAGE

Materials shall be wrapped for shipment and storage, delivered to the jobsite in manufacturer's original packaging, and stored in a clean, dry area in accordance with manufacturer's instructions.

1.8 WARRANTY

Manufacturer's standard performance guarantees or warranties that extend beyond a one year period shall be provided.

PART 2 PRODUCTS

2.1 DIMENSIONAL BUILDING LETTERS

2.1.1 Fabrication

Letters shall be fabricated from cast aluminum. Letters shall be cleaned by chemical etching or cleaned ultrasonically in a special degreasing bath. Letters shall be packaged for protection until installation.

2.1.2 Typeface

Typeface shall be as indicated.

2.1.3 Size

Letter size shall be 16 inches high.

2.1.4 Finish

Anodized aluminum finish shall be provided.

2.1.5 Mounting

Coordinate with metal clad manufacturer for mounting requirements. Mounting shall be such that the face of letters is as close to flush with cladding as possible.

Where necessary, steel U-bracket, cap screws, and expansion bolts of number and size as recommended by manufacturer, shall be used for concealed anchorage. Letters which project from the building line shall have stud spacer sleeves. Letters, studs, and sleeves shall be of the same material. Templates for mounting shall be supplied.

2.2 ORGANIC COATING

Surfaces shall be cleaned, primed, and given a semi-gloss baked enamel or two-component acrylic polyurethane finish in accordance with NAAMM AMP 505 with total dry film thickness not less than 1.2 mils.

2.3 STEEL PRODUCTS

Structural steel products shall conform to ASTM A 36/A 36M. Sheet and

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strip steel products shall conform to ASTM A 570/A 570M. Welding for steel products shall conform to AWS D1.2.

2.4 ANCHORS AND FASTENERS

Exposed anchor and fastener materials shall be compatible with metal to which applied and shall match in color and finish and shall be non-rusting, non-corroding, and non-staining.

2.5 SHOP FABRICATION AND MANUFACTURE

2.5.1 Factory Workmanship

Work shall be assembled in the shop, as far as practical, ready for installation at the site. Work that cannot be shop assembled shall be given a trial fit in the shop to ensure proper field assembly. Holes for bolts and screws shall be drilled or punched. Drilling and punching shall produce clean, true lines and surfaces. Welding to or on structural steel shall be in accordance with AWS D1.1. Welding shall be continuous along the entire area of contact. Exposed welds shall be ground smooth. Exposed surfaces of work shall have a smooth finish and exposed riveting shall be flush. Fastenings shall be concealed where practical. Items specified to be galvanized shall be by hot-dip process after fabrication if practical. Galvanization shall be in accordance with ASTM A 123/A 123M and ASTM A 653/A 653M, as applicable. Other metallic coatings of steel sheet shall be in accordance with ASTM A 924/A 924M. Joints exposed to the weather shall be formed to exclude water. Drainage and weep holes shall be included as required to prevent condensation buildup.

2.5.2 Dissimilar Materials

Where dissimilar metals are in contact, or where aluminum is in contact with concrete, mortar, masonry, wet or pressure-treated wood, or absorptive materials subject to wetting, the surfaces shall be protected with a coat of asphalt varnish or a coat of zinc-molybdate primer to prevent galvanic or corrosive action.

2.5.3 Shop Painting

Surfaces of miscellaneous metal work, except nonferrous metal, corrosion resisting steel, and zinc-coated work, shall be given one coat of zinc-molybdate primer or an approved rust-resisting treatment and metallic primer in accordance with manufacturer's standard practice. Surfaces of items to be embedded in concrete shall not be painted. Upon completion of work, damaged surfaces shall be recoated.

2.6 COLOR, FINISH, AND CONTRAST

Color of products shall be Burgandy. The characters and background of signs shall have a non-glare finish. Characters and symbols shall contrast with their background - dark characters on a light background.

PART 3 EXECUTION

3.1 INSTALLATION

Dimensional letters shall be installed in accordance with approved manufacturer's instructions at locations shown on the approved detail drawings. Signs shall be installed plumb and true at mounting heights

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indicated, and by method shown or specified. Signs mounted on other surfaces shall not be installed until finishes on such surfaces have been completed.

3.1.1 Anchorage

Anchorage and fastener materials shall be in accordance with approved manufacturer's instructions for the indicated substrate. Coordinate anchorage with requirements of metal cladding manufacturer. Anchorage not otherwise specified or indicated shall include slotted inserts, expansion shields, and machine carriage bolts.

3.1.2 Protection and Cleaning

The work shall be protected against damage during construction. After signs are completed and inspected, the Contractor shall cover all project identification, directional, and other signs which may mislead the public. Covering shall be maintained until instructed to be removed by the Contracting Officer or until the facility is to be opened for business. Signs shall be cleaned, as required, at time of cover removal.

3.2 FIELD PAINTED FINISH

Miscellaneous metals and frames shall be field painted in accordance with Section 09900 PAINTING, GENERAL. Anodized metals shall be protected from paint. Finish shall be free of scratches or other blemishes.

-- End of Section --

SECTION 10440

INTERIOR SIGNAGE
07/02

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

ALUMINUM ASSOCIATION (AA)

- | | |
|-----------|---|
| AA DAF-45 | (1997) Designation System for Aluminum Finishes |
| AA PK-1 | (1999) Registration Record of Aluminum Association Alloy Designations and Chemical Composition Limits for Aluminum Alloys in the Form of Castings and Ingot |

AMERICAN ARCHITECTURAL MANUFACTURERS ASSOCIATION (AAMA)

- | | |
|----------|--|
| AAMA 605 | (1998) Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels |
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AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

- | | |
|------------|---|
| ANSI Z97.1 | (1984; R 1994) Safety Performance Specifications and Methods of Test for Safety Glazing Materials Used in Buildings |
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AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

- | | |
|-------------|--|
| ASTM B 209 | (1996) Aluminum and Aluminum-Alloy Sheet and Plate |
| ASTM B 209M | (2000) Aluminum and Aluminum-Alloy Sheet and Plate (Metric) |
| ASTM B 221 | (2000) Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes |
| ASTM B 221M | (2000) Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric) |
| ASTM C 1036 | (1991; R 1997) Flat Glass |

AMERICAN WELDING SOCIETY (AWS)

AWS D1.2 (1997) Structural Welding Code - Aluminum

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70 (1999) National Electrical Code

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only or as otherwise designated. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Detail Drawings

Drawings showing elevations of each type of sign, dimensions, details and methods of mounting or anchoring, shape and thickness of materials, and details of construction. A schedule showing the location, each sign type, and message shall be included.

SD-03 Product Data

Installation

Manufacturer's descriptive data, catalogs cuts, installation and cleaning instructions.

SD-04 Samples

Interior Signage

One sample of each of the following sign types showing typical quality and workmanship. The samples may be installed in the work, provided each sample is identified and location recorded.

- a. Classroom identification sign.
- b. Stair identification sign.
- c. Restroom identification sign.

Two samples of manufacturer's standard color chips for each material requiring color selection.

SD-10 Operation and Maintenance Data

Approved Manufacturer's Instructions Protection and Cleaning

Six copies of operating instructions outlining the step-by-step procedures required for system operation shall be provided. The instructions shall include simplified diagrams for the system as installed. Six copies of maintenance instructions listing routine procedures, repairs, and guides shall be provided. The instructions shall include the manufacturer's name, model number,

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service manual, parts list, and brief description of all equipment and their basic operating features. Each set shall be permanently bound and shall have a hard cover. The following identification shall be inscribed on the covers: the words "OPERATING AND MAINTENANCE INSTRUCTIONS", name and location of the facility, name of the Contractor, and contract number.

1.3 GENERAL

Interior signage shall be of the design, detail, sizes, types, and message content shown on the drawings, shall conform to the requirements specified, and shall be provided at the locations indicated. Signs shall be complete with lettering, framing as detailed/specified, and related components for a complete installation. Recyclable materials shall conform to EPA requirements in accordance with Section 01670 RECYCLED / RECOVERED MATERIALS.

1.3.1 Character Proportions and Heights

The minimum height is measured using an upper case letter "X". Lower case characters are permitted.

1.3.2 Raised and Brailled Characters and Pictorial Symbol Signs (Pictograms)

Letters and numbers shall be raised 1/32 inch upper case, Halvetica type and shall be accompanied with Grade 2 Braille. Raised characters shall be 3/4" and 1-1/4" high; 1/8" thick. Pictograms shall be accompanied by the equivalent verbal description placed directly below the pictogram at types shown. The border dimension of the pictogram shall be 6 inches minimum in height. Indicated accessible facilities shall use the international symbol of accessibility.

1.4 QUALIFICATIONS

Signs and dimensional letters shall be the standard product of a manufacturer regularly engaged in the manufacture of such products and shall essentially duplicate signs that have been in satisfactory use at least 2 years prior to bid opening.

1.5 DELIVERY AND STORAGE

Materials shall be delivered to the jobsite in manufacturer's original packaging and stored in a clean, dry area in accordance with manufacturer's instructions.

1.6 EXTRA STOCK

The Contractor shall provide six extra stock of the following: Three blank plates of each color and size for sign types A. Three changeable message strips for sign type A.

PART 2 PRODUCTS

2.1 ROOM IDENTIFICATION/DIRECTIONAL SIGNAGE SYSTEM

Signs shall be fabricated of extruded aluminum conforming to 3003-H14ASTM B 209.

2.1.1 Standard Room Signs

Corners of signs shall be 3/4 inch radius.

2.1.2 Changeable Message Strip Signs

Changeable message strip signs shall consist of Type MP plastic captive message slider sign face with message slots for insertion of changeable message strips. Size of signs shall be as shown on the drawings. Individual message strips to permit removal, change, and reinsertion shall be provided. Corners of signs shall be 3/4 inch radius.

2.1.3 Type of Mounting For Signs

Extruded aluminum brackets, for surface mounting shall be provided. Surface mounted signs shall be provided with countersunk mounting holes in plaques and mounting screws. Sign inserts shall be provided with 1/16 inch thick foam tape.

2.1.4 Graphics

Signage graphics for modular identification/directional signs shall conform to the following:

Cast aluminum letters 1/8 inch thick shall be provided and fastened to the message panel with concealed fasteners. Aluminum letter finish shall be as specified. Letters shall project 1/32 inch minimum from face of panel.

2.2 BUILDING DIRECTORY

Building directory shall be lobby directory and shall be provided with a changeable directory listing consisting of the areas, offices and personnel located within the facility. Building directory shall be 30 inches x 48 inches, minimum.

2.2.1 Header Panel

Header panel shall have background metal to match frame and shall have raised letters.

2.2.2 Doors

2.2.2.1 Door Glazing

Door glazing shall be clear polycarbonate sheet 3/16 inch thick.

2.2.2.2 Door Construction

Extruded aluminum door frame shall be satin burgandy colored anodized finish. Corners shall be mitered, welded, and assembled with concealed fasteners. Hinges shall be standard with the manufacturer, in finish to match frames and trim. Glazing shall be set in frame with resilient glazing channels.

2.2.2.3 Door Locks

Door locks shall be manufacturer's standard, and shall be keyed alike.

2.2.3 Fabrication

Extruded aluminum frames and trim shall be assembled with corners welded and mitered to a hairline fit, with no exposed fasteners.

2.2.4 Changeable Letter/Message Strip Directory System

Directory shall consist of a non-illuminated unit.

2.2.4.1 Construction

The directory shall be constructed of an aluminum 2 inch deep frame with satin burgandy anodized finish. Unit shall be surface mounted. Unit shall have a 3 inch high header with 3/4" Helvetica Medium upper and lower case letters. Unit shall have a 3/8 inch face concealed hinge door and locking system with tempered safety glass. Door frame shall be aluminum with satin burgandy finish.

2.2.4.2 Message Strips

Namesstrips shall be felt grooved background with changeable upper and lower case Helvetica Medium letters. Tabbed vinyl letters and numbers shall be furnished in accordance with the drawings.

2.3 ALUMINUM ALLOY PRODUCTS

Aluminum extrusions shall be at least 1/8 inch thick, and aluminum plate or sheet shall be at least 0.0508 inch thick. Extrusions shall conform to ASTM B 221; plate and sheet shall conform to ASTM B 209. Where anodic coatings are specified, alloy shall conform to AA PK-1 alloy designation 514.0. Exposed anodized aluminum finishes shall be as shown. Welding for aluminum products shall conform to AWS D1.2.

2.4 ANODIC COATING

Anodized finish shall conform to AA DAF-45 as follows:

Electrolytically deposited color-anodized designation AA-M10-C22-A34, Architectural Class II 0.4 to 0.7 mil.

2.5 ORGANIC COATING

Organic coating shall conform to AAMA 605, with total dry film thickness not less than 1.2 mils.

2.6 FABRICATION AND MANUFACTURE

2.6.1 Factory Workmanship

Holes for bolts and screws shall be drilled or punched. Drilling and punching shall produce clean, true lines and surfaces. Exposed surfaces of work shall have a smooth finish and exposed riveting shall be flush. Fastenings shall be concealed.

2.6.2 Dissimilar Materials

Where dissimilar metals are in contact, the surfaces will be protected to prevent galvanic or corrosive action.

2.7 COLOR, FINISH, AND CONTRAST

Color shall be burgandy backgrounds with gold colored letters. The characters and background of signs shall be non-glare finish.

PART 3 EXECUTION

3.1 INSTALLATION

Signs shall be installed in accordance with approved manufacturer's instructions at locations shown on the detail drawings. Signs shall be installed plumb and true at mounting heights indicated, and by method shown or specified. Provide blocking at all gypsum board partitions to receive installation. Signs shall be installed on the wall adjacent to the latch side of the door. Where there is no wall space to the latch side of the door, including at double leaf doors, signs shall be placed on the nearest adjacent wall. Mounting location for such signage shall be so that a person may approach within 3 inches of signage without encountering protruding objects or standing within the swing of a door. Signs on doors or other surfaces shall not be installed until finishes on such surfaces have been installed. Signs installed on glass surfaces shall be installed with matching blank back-up plates in accordance with manufacturer's instructions.

3.1.1 Anchorage

Anchorage shall be in accordance with approved manufacturer's instructions. Anchorage not otherwise specified or shown shall include slotted inserts, expansion shields, and powder-driven fasteners when approved for concrete; toggle bolts for masonry and gypsum board; machine carriage bolts for steel. Exposed anchor and fastener materials shall be compatible with metal to which applied and shall have matching color and finish. Signs mounted to painted gypsum board surfaces shall be removable for painting maintenance.

3.1.2 Protection and Cleaning

The work shall be protected against damage during construction. Hardware and electrical equipment shall be adjusted for proper operation. Glass, frames, and other sign surfaces shall be cleaned in accordance with the manufacturer's approved instructions.

-- End of Section --

SECTION 13930

WET PIPE SPRINKLER SYSTEM, FIRE PROTECTION

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 135	(2001) Electric-Resistance-Welded Steel Pipe
ASTM A 183	(1998) Carbon Steel Track Bolts and Nuts
ASTM A 47/A 47M	(1999) Ferritic Malleable Iron Castings
ASTM A 53/A 53M	(2001) Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
ASTM A 536	(1984; R 1999el) Ductile Iron Castings
ASTM A 795	(2000) Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless Steel Pipe for Fire Protection Use
ASTM B 62	(1993) Composition Bronze or Ounce Metal Castings
ASTM B 75	(1999) Seamless Copper Tube
ASTM B 88	(1999) Seamless Copper Water Tube
ASTM D 2000	(1999) Rubber Products in Automotive Applications
ASTM F 436	(2000) Hardened Steel Washers
ASTM F 442/F 442M	(1999) Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe (SDR-PR)

AMERICAN SOCIETY OF SANITARY ENGINEERING (ASSE)

ASSE 1015	(1999) Double Check Backflow Prevention Assembly
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AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA B300	(1999) Hypochlorites
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AWWA B301	(1992; Addenda B301a - 1999) Liquid Chlorine
AWWA C104	(1995) Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water
AWWA C110	(1998) Ductile-Iron and Gray-Iron Fittings, 3 In. Through 48 In. (75 mm through 1200 mm), for Water and Other Liquids
AWWA C111	(2000) Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
AWWA C151	(1996) Ductile-Iron Pipe, Centrifugally Cast, for Water or Other Liquids
AWWA C203	(1997; Addenda C203a - 1999) Coal-Tar Protective Coatings and Linings for Steel Water Pipelines - Enamel and Tape - Hot-Applied
AWWA C606	(1997) Grooved and Shouldered Joints
AWWA EWW	(1999) Standard Methods for the Examination of Water and Wastewater
AWWA M20	(1973) Manual: Water Chlorination Principles and Practices

ASME INTERNATIONAL (ASME)

ASME B16.1	(1998) Cast Iron Pipe Flanges and Flanged Fittings
ASME B16.11	(1996) Forged Fittings, Socket-Welding and Threaded
ASME B16.18	(1984; R 1994) Cast Copper Alloy Solder Joint Pressure Fittings
ASME B16.21	(1992) Nonmetallic Flat Gaskets for Pipe Flanges
ASME B16.22	(1995; B16.22a1998) Wrought Copper and Copper Alloy Solder Joint Pressure Fittings
ASME B16.26	(1988) Cast Copper Alloy Fittings for Flared Copper Tubes
ASME B16.4	(1998) Gray Iron Threaded Fittings
ASME B16.9	(1993) Factory-Made Wrought Steel Buttwelding Fittings
ASME B18.2.1	(1996) Square and Hex Bolts and Screws (Inch Series)

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ASME B18.2.2 (1987; R 1993) Square and Hex Nuts (Inch Series)

FACTORY MUTUAL ENGINEERING AND RESEARCH (FM)

FM P7825a (1998) Approval Guide Fire Protection

FM P7825b (1998) Approval Guide Electrical Equipment

MANUFACTURERS STANDARDIZATION SOCIETY OF THE VALVE AND FITTINGS
INDUSTRY (MSS)

MSS SP-71 (1997) Gray Iron Swing Check Valves,
Flanges and Threaded Ends

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 24 (1995) Installation of Private Fire
Service Mains and Their Appurtenances

NATIONAL INSTITUTE FOR CERTIFICATION IN ENGINEERING TECHNOLOGIES
(NICET)

NICET 1014-7 (1995) Program Detail Manual for
Certification in the Field of Fire
Protection Engineering Technology (Field
Code 003) Subfield of Automatic Sprinkler
System Layout

UNDERWRITERS LABORATORIES (UL)

UL 668 (1995; Rev thru Dec 1998) Hose Valves for
Fire Protection Service

UL Bld Mat Dir (1999) Building Materials Directory

UL Fire Prot Dir (1999) Fire Protection Equipment Directory

1.2 GENERAL REQUIREMENTS

Wet and dry pipe sprinkler systems shall be provided in areas as indicated on the drawings. The sprinkler system shall provide fire sprinkler protection for the entire area. Except as modified herein, the system shall be designed and installed in accordance with NFPA 13 and NFPA 14. Rack sprinklers shall be in accordance with NFPA 230. Pipe sizes which are not indicated on drawings shall be determined by hydraulic calculation. The Contractor shall design any portions of the sprinkler system that are not indicated on the drawings including locating sprinklers, piping and equipment, and size piping and equipment when this information is not indicated on the drawings or is not specified herein. The design of the sprinkler system shall be based on hydraulic calculations, and the other provisions specified herein.

1.2.1 Hydraulic Design

The sprinkler contractor shall provide as-built drawings indicating all zonings and sprinklers locations. The system shall be hydraulically designed. The hydraulic calculations shall be in accordance with the Area/Density Method of NFPA 13. Water velocity in the piping shall not

exceed 10 ft/s.

1.2.1.1 Hose Demand

An allowance for exterior hose streams of 250 gpm shall be added to the sprinkler system demand at the point of connection to the existing system.

1.2.1.2 Basis for Calculations

Water supply shall be presumed available at the point of connection to existing. Hydraulic calculations shall be based upon the Hazen-Williams formula with a "C" value of 120 for steel piping, 150 for copper tubing, 140 for new cement-lined ductile-iron piping, and 100 for existing underground piping.

1.2.2 Sprinkler Coverage

Sprinklers shall be uniformly spaced on branch lines. In buildings protected by automatic sprinklers, sprinklers shall provide coverage throughout 100 percent of the building. This includes, but is not limited to, telephone rooms, electrical equipment rooms, boiler rooms, switchgear rooms, transformer rooms, and other electrical and mechanical spaces. Coverage per sprinkler shall be in accordance with NFPA 13; as specified in NFPA 13 for extra hazard occupancy but not to exceed 225 square feet for light hazard or 130 square feet for ordinary hazard occupancies.

1.3 COORDINATION OF TRADES

Piping offsets, fittings, and any other accessories required shall be furnished as required to provide a complete installation and to eliminate interference with other construction. Sprinkler shall be installed over and under ducts, piping and platforms when such equipment can negatively effect or disrupt the sprinkler discharge pattern and coverage.

1.4 DELIVERY AND STORAGE

All equipment delivered and placed in storage shall be housed in a manner to preclude any damage from the weather, humidity and temperature variations, dirt and dust, or other contaminants. Additionally, all pipes shall either be capped or plugged until installed.

1.5 FIELD MEASUREMENTS

The Contractor shall become familiar with all details of the work, verify all dimensions in the field, and shall advise the Contracting Officer of any discrepancy before performing the work.

1.6 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Sprinkler System Shop Drawings; G, A, E.

THOMSON ELELMENTARY SCHOOL
RENOVATION AND ADDITION

Six copies of the Sprinkler System Shop Drawings, no later than 45 days prior to the start of sprinkler system installation. The Sprinkler System Shop Drawings shall conform to the requirements established for working plans as prescribed in NFPA 13. Drawings shall include plan and elevation views demonstrating that the equipment will fit the allotted spaces with clearance for installation and maintenance. Each set of drawings shall include the following:

a. Descriptive index of drawings in the submittal with drawings listed in sequence by drawing number. A legend identifying device symbols, nomenclature, and conventions used.

b. Floor plans drawn to a scale not less than $1/8" = 1'-0"$ which clearly show locations of sprinklers, risers, pipe hangers, seismic separation assemblies, sway bracing, inspector's test connections, drains, and other applicable details necessary to clearly describe the proposed arrangement. Each type of fitting used and the locations of bushings, reducing couplings, and welded joints shall be indicated.

c. Actual center-to-center dimensions between sprinklers on branch lines and between branch lines; from end sprinklers to adjacent walls; from walls to branch lines; from sprinkler feed mains, cross-mains and branch lines to finished floor and roof or ceiling. A detail shall show the dimension from the sprinkler and sprinkler deflector to the ceiling in finished areas.

d. Longitudinal and transverse building sections showing typical branch line and cross-main pipe routing as well as elevation of each typical sprinkler above finished floor.

e. Details of each type of riser assembly; pipe hanger; sway bracing for earthquake protection, and restraint of underground water main at point-of-entry into the building, and electrical devices and interconnecting wiring.

As-Built Shop Drawings; G, A, E.

As-built shop drawings, at least 14 days after completion of the Final Tests. The Sprinkler System Drawings shall be updated to reflect as-built conditions after all related work is completed and shall be on reproducible full-size mylar film.

SD-03 Product Data

Fire Protection Related Submittals; G, A, E.

A list of the Fire Protection Related Submittals, no later than 7 days after the approval of the Fire Protection Specialist.

Load Calculations for Sizing Sway Bracing; G, A, E.

For systems that are required to be protected against damage from earthquakes, load calculations shall be provided for sizing of sway bracing.

Components and Equipment Data; G, A, E.

THOMSON ELEMENTARY SCHOOL
RENOVATION AND ADDITION

Manufacturer's catalog data included with the Sprinkler System Drawings for all items specified herein. The data shall be highlighted to show model, size, options, etc., that are intended for consideration. Data shall be adequate to demonstrate compliance with all contract requirements. In addition, a complete equipment list that includes equipment description, model number and quantity shall be provided.

Hydraulic Calculations; G, A, E.

Hydraulic calculations, including a drawing showing hydraulic reference points and pipe segments.

Spare Parts; G, A, E.

Spare parts data shall be included for each different item of material and equipment specified. The data shall include a complete list of parts and supplies, with current unit prices and source of supply, and a list of parts recommended by the manufacturer to be replaced after 1 year and 3 years of service. A list of special tools and test equipment required for maintenance and testing of the products supplied by the Contractor shall be included.

Preliminary Tests Procedures; G, A, E.

Proposed procedures for Preliminary Tests, no later than 14 days prior to the proposed start of the tests.

Final Acceptance Test Procedures; G, A, E.

Proposed procedures for Final Acceptance Test, no later than 14 days prior to the proposed start of the tests.

On-site Training Schedule; G, A, E.

Proposed On-site Training schedule, at least 14 days prior to the start of related training.

Preliminary Tests; G, A, E.

Proposed date and time to begin Preliminary Tests, submitted with the Preliminary Tests Procedures.

Final Acceptance Test; G, A, E.

Proposed date and time to begin Final Acceptance Test, submitted with the Final Acceptance Test Procedures. Notification shall be provided at least 14 days prior to the proposed start of the test. Notification shall include a copy of the Contractor's Material & Test Certificates.

Fire Protection Specialist Qualifications; G, A, E.

The name and documentation of certification of the proposed Fire Protection Specialists, no later than 14 days after the Notice to Proceed and prior to the submittal of the sprinkler system

drawings and hydraulic calculations.

Sprinkler System Installer Qualifications; G, A, E.

The name and documentation of certification of the proposed Sprinkler System Installer, concurrent with submittal of the Fire Protection Specialist Qualifications.

SD-06 Test Reports

Preliminary Tests Report; G, A.

Six copies of the completed Preliminary Tests Reports, no later than 7 days after the completion of the Preliminary Tests. The Preliminary Tests Report shall include both the Contractor's Material and Test Certificate for Underground Piping and the Contractor's Material and Test Certificate for Aboveground Piping. All items in the Preliminary Tests Report shall be signed by the Fire Protection Specialist.

Final Acceptance Test Report; G, A.

Six copies of the completed Final Acceptance Tests Reports, no later than 7 days after the completion of the Final Acceptance Tests. All items in the Final Acceptance Report shall be signed by the Fire Protection Specialist.

SD-07 Certificates

Fire Protection Specialist Inspection; G, A.

Concurrent with the Final Acceptance Test Report, certification by the Fire Protection Specialist that the sprinkler system is installed in accordance with the contract requirements, including signed approval of the Preliminary and Final Acceptance Test Reports.

SD-10 Operation and Maintenance Data

Wet Pipe Sprinkler System; G, A.

Six manuals listing step-by-step procedures required for system startup, operation, shutdown, and routine maintenance, at least 14 days prior to field training. The manuals shall include the manufacturer's name, model number, parts list, list of parts and tools that should be kept in stock by the owner for routine maintenance including the name of a local supplier, simplified wiring and controls diagrams, troubleshooting guide, and recommended service organization (including address and telephone number) for each item of equipment. Each service organization submitted shall be capable of providing 4 hour on-site response to a service call on an emergency basis.

1.7 HYDRAULIC CALCULATIONS

Hydraulic calculations shall be as outlined in NFPA 13 except that calculations shall be performed by computer using software intended specifically for fire protection system design using the design data shown on the drawings. Software that uses k-factors for typical branch lines is

not acceptable. Calculations shall be based on the water supply data shown on the drawings. Calculations shall substantiate that the design area used in the calculations is the most demanding hydraulically. Water supply curves and system requirements shall be plotted on semi-logarithmic graph paper so as to present a summary of the complete hydraulic calculation. A summary sheet listing sprinklers in the design area and their respective hydraulic reference points, elevations, actual discharge pressures and actual flows shall be provided. Elevations of hydraulic reference points (nodes) shall be indicated. Documentation shall identify each pipe individually and the nodes connected thereto. The diameter, length, flow, velocity, friction loss, number and type fittings, total friction loss in the pipe, equivalent pipe length and Hazen-Williams coefficient shall be indicated for each pipe. For gridded systems, calculations shall show peaking of demand area friction loss to verify that the hydraulically most demanding area is being used. Also for gridded systems, a flow diagram indicating the quantity and direction of flows shall be included. A drawing showing hydraulic reference points (nodes) and pipe designations used in the calculations shall be included and shall be independent of shop drawings.

1.8 FIRE PROTECTION SPECIALIST

Work specified in this section shall be performed under the supervision of and certified by the Fire Protection Specialist. The Fire Protection Specialist shall be an individual who is a registered professional engineer and a Full Member of the Society of Fire Protection Engineers or who is certified as a Level [III] [IV] Technician by National Institute for Certification in Engineering Technologies (NICET) in the Automatic Sprinkler System Layout subfield of Fire Protection Engineering Technology in accordance with NICET 1014-7. The Fire Protection Specialist shall be regularly engaged in the design and installation of the type and complexity of system specified in the Contract documents, and shall have served in a similar capacity for at least three systems that have performed in the manner intended for a period of not less than 6 months.

1.9 SPRINKLER SYSTEM INSTALLER QUALIFICATIONS

Work specified in this section shall be performed by the Sprinkler System Installer. The Sprinkler System Installer shall be regularly engaged in the installation of the type and complexity of system specified in the Contract documents, and shall have served in a similar capacity for at least three systems that have performed in the manner intended for a period of not less than 6 months.

1.10 REGULATORY REQUIREMENTS

Compliance with referenced NFPA standards is mandatory. This includes advisory provisions listed in the appendices of such standards, as though the word "shall" had been substituted for the word "should" wherever it appears. In the event of a conflict between specific provisions of this specification and applicable NFPA standards, this specification shall govern. Reference to "authority having jurisdiction" shall be interpreted to mean the Contracting Officer.

PART 2 PRODUCTS

2.1 STANDARD PRODUCTS

Materials and equipment shall be standard products of a manufacturer regularly engaged in the manufacture of such products and shall essentially duplicate items that have been in satisfactory use for at least 2 years prior to bid opening.

2.2 NAMEPLATES

All equipment shall have a nameplate that identifies the manufacturer's name, address, type or style, model or serial number, and catalog number.

2.3 REQUIREMENTS FOR FIRE PROTECTION SERVICE

Materials and Equipment shall have been tested by Underwriters Laboratories, Inc. and listed in UL Fire Prot Dir or approved by Factory Mutual and listed in FM P7825a and FM P7825b. Where the terms "listed" or "approved" appear in this specification, such shall mean listed in UL Fire Prot Dir or FM P7825a and FM P7825b

2.4 UNDERGROUND PIPING COMPONENTS

2.4.1 Pipe

Piping from a point 6 inches above the floor to the point of connection to the existing water mains shall be ductile iron with a rated working pressure of 175 psi conforming to AWWA C151, with cement mortar lining conforming to AWWA C104. Piping more than 5 feet outside the building walls shall comply with Section 02510A WATER DISTRIBUTION SYSTEM.

2.4.2 Fittings and Gaskets

Fittings shall be ductile iron conforming to AWWA C110. Gaskets shall be suitable in design and size for the pipe with which such gaskets are to be used. Gaskets for ductile iron pipe joints shall conform to AWWA C111.

2.4.3 Gate Valve and Indicator Posts

Gate valves for underground installation shall be of the inside screw type with counter-clockwise rotation to open. Where indicating type valves are shown or required, indicating valves shall be gate valves with an approved indicator post of a length to permit the top of the post to be located 3 feet above finished grade. Gate valves and indicator posts shall be listed in UL Fire Prot Dir or FM P7825a and FM P7825b.

2.5 ABOVEGROUND PIPING COMPONENTS

Aboveground piping shall be steel.

2.5.1 Steel Piping Components

2.5.1.1 Steel Pipe

Except as modified herein, steel pipe shall be black as permitted by NFPA 13 and shall conform to applicable provisions of ASTM A 795, ASTM A 53/A 53M, or ASTM A 135. Pipe in which threads or grooves are cut shall be Schedule 40 or shall be listed by Underwriters' Laboratories to have a corrosion resistance ratio (CRR) of 1.0 or greater after threads or grooves are cut. Pipe shall be marked with the name of the manufacturer, kind of pipe, and ASTM designation.

2.5.1.2 Fittings for Non-Grooved Steel Pipe

Fittings shall be cast iron conforming to ASME B16.4, steel conforming to ASME B16.9 or ASME B16.11, or malleable iron conforming to ASME B16.3. Steel press fittings shall be approved for fire protection systems. Galvanized fittings shall be used for piping systems or portions of piping systems utilizing galvanized piping. Fittings into which sprinklers, drop nipples or riser nipples are screwed shall be threaded type. Plain-end fittings with mechanical couplings, fittings that use steel gripping devices to bite into the pipe and segmented welded fittings shall not be used.

2.5.1.3 Grooved Mechanical Joints and Fittings

Joints and fittings shall be designed for not less than 175 psi service and shall be the product of the same manufacturer; segmented welded fittings shall not be used. Fitting and coupling houses shall be malleable iron conforming to ASTM A 47/A 47M, Grade 32510; ductile iron conforming to ASTM A 536, Grade 65-45-12. Gasket shall be the flush type that fills the entire cavity between the fitting and the pipe. Nuts and bolts shall be heat-treated steel conforming to ASTM A 183 and shall be cadmium plated or zinc electroplated.

2.5.1.4 Flanges

Flanges shall conform to NFPA 13 and ASME B16.1. Gaskets shall be non-asbestos compressed material in accordance with ASME B16.21, 1/16 inch thick, and full face or self-centering flat ring type.

2.5.1.5 Bolts, Nut, and Washers

Bolts shall be squarehead conforming to ASME B18.2.1 and shall extend no less than three full threads beyond the nut with bolts tightened to the required torque. Nuts shall be hexagon type conforming to ASME B18.2.2. Washers shall meet the requirements of ASTM F 436. Flat circular washers shall be provided under all bolt heads and nuts.

2.5.2 Copper Tube Components

2.5.2.1 Copper Tube

Copper tube shall conform to ASTM B 88, Types L and M.

2.5.2.2 Copper Fittings and Joints

Cast copper alloy solder-joint pressure fittings shall conform to ASME B16.18 and wrought copper and bronze solder-joint pressure fittings shall conform to ASME B16.22 and ASTM B 75. Cast copper alloy fittings for flared copper tube shall conform to ASME B16.26 and ASTM B 62. Brass or bronze adapters for brazed tubing may be used for connecting tubing to flanges and to threaded ends of valves and equipment. Extracted brazed tee joints produced with an acceptable tool and installed as recommended by the manufacturer may be used. Grooved mechanical joints and fittings shall be designed for not less than 125 psig service and shall be the product of the same manufacturer. Grooved fitting and mechanical coupling housing shall be ductile iron conforming to ASTM A 536. Gaskets for use in grooved joints shall be molded synthetic polymer of pressure responsive design and shall conform to ASTM D 2000 for circulating medium up to 230 degrees F.

Grooved joints shall conform to AWWA C606. Coupling nuts and bolts for use in grooved joints shall be steel and shall conform to ASTM A 183.

2.5.3 Plastic Piping Components

2.5.3.1 Plastic Pipe

Plastic pipe shall be chlorinated polyvinyl chloride (CPVC) conforming to ASTM F 442/F 442M, 175 psi rating and listed in UL Fire Prot Dir for use in wet pipe sprinkler systems.

2.5.3.2 Plastic Fittings

Plastic fitting shall be chlorinated polyvinyl chloride (CPVC) as listed in UL Fire Prot Dir for use in wet pipe sprinkler systems.

2.5.4 Pipe Hangers

Hangers shall be listed in UL Fire Prot Dir or FM P7825a and FM P7825b and of the type suitable for the application, construction, and pipe type and sized to be supported.

2.5.5 Valves

2.5.5.1 Control Valve and Gate Valve

Manually operated sprinkler control valve and gate valve shall be outside stem and yoke (OS&Y) type and shall be listed in UL Bld Mat Dir or FM P7825a and FM P7825b.

2.5.5.2 Check Valve

Check valve 2 inches and larger shall be listed in UL Bld Mat Dir or FM P7825a and FM P7825b. Check valves 4 inches and larger shall be of the swing type with flanged cast iron body and flanged inspection plate, shall have a clear waterway and shall meet the requirements of MSS SP-71, for Type 3 or 4.

2.5.5.3 Hose Valve

Valve shall comply with UL 668 and shall have a minimum rating of 300 psi. Valve shall be non-rising stem, all bronze, 90 degree angle type, with 2-1/2 inch American National Standard Fire Hose Screw Thread (NH) male outlet in accordance with NFPA 1963. Hose valve shall be provided with 2-1/2 to 1-1/2 inch reducer. Hose valves shall be equipped with lugged cap with drip drain, cap gasket and chain. Valve finish shall be polished chrome plated.

2.6 ALARM CHECK VALVE ASSEMBLY

Assembly shall include an alarm check valve, standard trim piping, pressure gauges, bypass, retarding chamber, testing valves, main drain, and other components as required for a fully operational system.

2.7 WATERFLOW ALARM

Mechanically operated, exterior-mounted, water motor alarm assembly shall be provided and installed in accordance with NFPA 13. Water motor alarm

assembly shall include a body housing, impeller or pelton wheel, drive shaft, striker assembly, gong, wall plate and related components necessary for complete operation. Minimum 3/4 inch galvanized piping shall be provided between the housing and the alarm check valve. Drain piping from the body housing shall be minimum 1 inch galvanized and shall be arranged to drain to the outside of the building. Piping shall be galvanized both on the inside and outside surfaces.

2.8 ALARM INITIATING AND SUPERVISORY DEVICES

2.8.1 Sprinkler Waterflow Indicator Switch, Vane Type

Switch shall be vane type with a pipe saddle and cast aluminum housing. The electro-mechanical device shall include a flexible, low-density polyethylene paddle conforming to the inside diameter of the fire protection pipe. The device shall sense water movements and be capable of detecting a sustained flow of 10 gpm or greater. The device shall contain a retard device adjustable from 0 to 90 seconds to reduce the possibility of false alarms caused by transient flow surges. The switch shall be tamper resistant and contain two SPDT (Form C) contacts arranged to transfer upon removal of the housing cover, and shall be equipped with a silicone rubber gasket to assure positive water seal and a dustproof cover and gasket to seal the mechanism from dirt and moisture.

2.8.2 Sprinkler Pressure (Waterflow) Alarm Switch

Pressure switch shall include a metal housing with a neoprene diaphragm, SPDT snap action switches and a 1/2 inch NPT male pipe thread. The switch shall have a maximum service pressure rating of 175 psi. There shall be two SPDT (Form C) contacts factory adjusted to operate at 4 to 8 psi. The switch shall be capable of being mounted in any position in the alarm line trim piping of the alarm check valve.

2.8.3 Valve Supervisory (Tamper) Switch

Switch shall be suitable for mounting to the type of control valve to be supervised open. The switch shall be tamper resistant and contain one set of SPDT (Form C) contacts arranged to transfer upon removal of the housing cover or closure of the valve of more than two rotations of the valve stem.

2.9 FIRE DEPARTMENT CONNECTION

Fire department connection shall be flush type with cast brass body, matching wall escutcheon lettered "Auto Spkr" with a polished brass finish. The connection shall have two inlets with individual self-closing clappers, caps with drip drains and chains. Female inlets shall have 2-1/2 inch diameter American National Fire Hose Connection Screw Threads (NH) per NFPA 1963.

2.10 SPRINKLERS

Sprinklers with internal O-rings shall not be used. Sprinklers shall be used in accordance with their listed coverage limitations. Temperature classification shall be as indicated. Sprinklers in high heat areas including attic spaces or in close proximity to unit heaters shall have temperature classification in accordance with NFPA 13. Extended coverage sprinklers shall not be used.

2.10.1 Concealed Sprinkler

Concealed sprinkler shall be chrome-plated quick-response type and shall have a nominal 1/2 inch or 17/32 inch orifice.

2.10.2 Recessed Sprinkler

Upright sprinkler shall be chrome-plated quick-response type and shall have a nominal 1/2 inch or 17/32 inch orifice.

2.10.3 Flush Sprinkler

Flush sprinkler shall be chrome-plated quick-response type and shall have a nominal 1/2 inch or 17/32 inch orifice.

2.10.4 Pendent Sprinkler

Pendent sprinkler shall be of the fusible strut or glass bulb type, recessed quick-response type with nominal 1/2 inch [or 17/32 inch] orifice. Pendent sprinklers shall have a polished chrome finish.

2.10.5 Upright Sprinkler

Upright sprinkler shall be chrome-plated quick-response type and shall have a nominal 1/2 inch or 17/32 inch orifice.

2.10.6 Sidewall Sprinkler

Sidewall sprinkler shall have a nominal 1/2 inch orifice. Sidewall sprinkler shall have a polished chrome finish. Sidewall sprinkler shall be the quick-response type.

2.10.7 Dry Sprinkler Assembly

Dry sprinkler assembly shall be of the pendent, sidewall, 45-degree type as indicated. Assembly shall include an integral escutcheon. Maximum length shall not exceed maximum indicated in UL Fire Prot Dir. Sprinklers shall have a polished chrome finish.

2.11 DISINFECTING MATERIALS

2.11.1 Liquid Chlorine

Liquid chlorine shall conform to AWWA B301.

2.11.2 Hypochlorites

Calcium hypochlorite and sodium hypochlorite shall conform to AWWA B300.

2.12 ACCESSORIES

2.12.1 Sprinkler Cabinet

Spare sprinklers shall be provided in accordance with NFPA 13 and shall be packed in a suitable metal or plastic cabinet. Spare sprinklers shall be representative of, and in proportion to, the number of each type and temperature rating of the sprinklers installed. At least one wrench of each type required shall be provided.

2.12.2 Pendent Sprinkler Escutcheon

Escutcheon shall be one-piece metallic type with a depth of less than 3/4 inch and suitable for installation on pendent sprinklers. The escutcheon shall have a factory finish that matches the pendent sprinkler heads.

2.12.3 Pipe Escutcheon

Escutcheon shall be polished chromium-plated zinc alloy, or polished chromium-plated copper alloy. Escutcheons shall be either one-piece or split-pattern, held in place by internal spring tension or set screw.

2.12.4 Sprinkler Guard

Guard shall be a steel wire cage designed to encase the sprinkler and protect it from mechanical damage. Guards shall be provided on sprinklers as indicated.

2.12.5 Identification Sign

Valve identification sign shall be minimum 6 inches wide x 2 inches high with enamel baked finish on minimum 18 gauge steel or 0.024 inch aluminum with red letters on a white background or white letters on red background. Wording of sign shall include, but not be limited to "main drain," "auxiliary drain," "inspector's test," "alarm test," "alarm line," and similar wording as required to identify operational components.

2.13 FIRE HOSE REEL ASSEMBLY

Assembly shall include nozzle, fire hose, reel, 1-1/2 inch valve, and bracket suitable for wall mounting. The assembly shall be semi-automatic type complete with Underwriters clip which permits controlled one-man operation whereby control valve can be opened, hose unreeled and clip released by pulling on hose. Valve shall be non-rising stem, all bronze, angle type with 1-1/2 inch American National Standard Fire Hose Screw Thread (NH) male outlet in accordance with NFPA 1963. Reel shall be of steel construction with red enamel finish and shall be equipped with 100 feet of 1-1/2 inch rubber lined fire hose. Nozzle shall be of the industrial combination fog-straight stream type with shutoff. Components of the assembly shall be listed in UL Fire Prot Dir.

2.14 DOUBLE-CHECK VALVE BACKFLOW PREVENTION ASSEMBLY

Double-check backflow prevention assembly shall comply with ASSE 1015. The assembly shall have a bronze, cast-iron or stainless steel body with flanged ends. The assembly shall include pressure gauge test ports and OS&Y shutoff valves on the inlet and outlet, 2-positive-seating check valve for continuous pressure application, and four test cocks. Assemblies shall be rated for working pressure of 175 psi. The maximum pressure loss shall be 6 psi at a flow rate equal to the sprinkler water demand, at the location of the assembly. A test port for a pressure gauge shall be provided both upstream and downstream of the double check backflow prevention assembly valves.

PART 3 EXECUTION

3.1 FIRE PROTECTION RELATED SUBMITTALS

The Fire Protection Specialist shall prepare a list of the submittals from the Contract Submittal Register that relate to the successful installation

of the sprinkler systems. The submittals identified on this list shall be accompanied by a letter of approval signed and dated by the Fire Protection Specialist when submitted to the Government.

3.2 INSTALLATION REQUIREMENTS

The installation shall be in accordance with the applicable provisions of NFPA 13, NFPA 24 and publications referenced therein. Installation of in-rack sprinklers shall comply with applicable provisions of NFPA 230.

3.3 INSPECTION BY FIRE PROTECTION SPECIALIST

The Fire Protection Specialist shall inspect the sprinkler system periodically during the installation to assure that the sprinkler system is being provided and installed in accordance with the contract requirements. The Fire Protection Specialist shall witness the preliminary and final tests, and shall sign the test results. The Fire Protection Specialist, after completion of the system inspections and a successful final test, shall certify in writing that the system has been installed in accordance with the contract requirements. Any discrepancy shall be brought to the attention of the Contracting Officer in writing, no later than three working days after the discrepancy is discovered.

3.4 ABOVEGROUND PIPING INSTALLATION

3.4.1 Piping in Exposed Areas

Exposed piping shall be installed so as not to diminish exit access widths, corridors or equipment access. Exposed horizontal piping, including drain piping, shall be installed to provide maximum headroom.

3.4.2 Piping in Finished Areas

In areas with suspended or dropped ceilings and in areas with concealed spaces above the ceiling, piping shall be concealed above ceilings. Piping shall be inspected, tested and approved before being concealed. Risers and similar vertical runs of piping in finished areas shall be concealed.

3.4.3 Pendent Sprinklers

Drop nipples to pendent sprinklers shall consist of minimum 1 inch pipe with a reducing coupling into which the sprinkler shall be threaded. Hangers shall be provided on arm-overs to drop nipples supplying pendent sprinklers when the arm-over exceeds 12 inches. Where sprinklers are installed below suspended or dropped ceilings, drop nipples shall be cut such that sprinkler ceiling plates or escutcheons are of a uniform depth throughout the finished space. The outlet of the reducing coupling shall not extend more than 1 inch below the underside of the ceiling. On pendent sprinklers installed below suspended or dropped ceilings, the distance from the sprinkler deflector to the underside of the ceiling shall not exceed 4 inches. Recessed pendent sprinklers shall be installed such that the distance from the sprinkler deflector to the underside of the ceiling shall not exceed the manufacturer's listed range and shall be of uniform depth throughout the finished area.

3.4.3.1 Pendent Sprinkler Locations

Pendent sprinklers in suspended ceilings shall be a minimum of 6 inches from ceiling grid.

3.4.4 Upright Sprinklers

Riser nipples or "sprigs" to upright sprinklers shall contain no fittings between the branch line tee and the reducing coupling at the sprinkler. Riser nipples exceeding 30 inches in length shall be individually supported.

3.4.5 Pipe Joints

Pipe joints shall conform to NFPA 13, except as modified herein. Not more than four threads shall show after joint is made up. Welded joints will be permitted, only if welding operations are performed as required by NFPA 13 at the Contractor's fabrication shop, not at the project construction site.

Flanged joints shall be provided where indicated or required by NFPA 13. Grooved pipe and fittings shall be prepared in accordance with the manufacturer's latest published specification according to pipe material, wall thickness and size. Grooved couplings, fittings and grooving tools shall be products of the same manufacturer. For copper tubing, pipe and groove dimensions shall comply with the tolerances specified by the coupling manufacturer. The diameter of grooves made in the field shall be measured using a "go/no-go" gauge, vernier or dial caliper, narrow-land micrometer, or other method specifically approved by the coupling manufacturer for the intended application. Groove width and dimension of groove from end of pipe shall be measured and recorded for each change in grooving tool setup to verify compliance with coupling manufacturer's tolerances. Grooved joints shall not be used in concealed locations, such as behind solid walls or ceilings, unless an access panel is shown on the drawings for servicing or adjusting the joint.

3.4.6 Reducers

Reductions in pipe sizes shall be made with one-piece tapered reducing fittings. The use of grooved-end or rubber-gasketed reducing couplings will not be permitted. When standard fittings of the required size are not manufactured, single bushings of the face type will be permitted. Where used, face bushings shall be installed with the outer face flush with the face of the fitting opening being reduced. Bushings shall not be used in elbow fittings, in more than one outlet of a tee, in more than two outlets of a cross, or where the reduction in size is less than 1/2 inch.

3.4.7 Pipe Penetrations

Cutting structural members for passage of pipes or for pipe-hanger fastenings will not be permitted. Pipes that must penetrate concrete or masonry walls or concrete floors shall be core-drilled and provided with pipe sleeves. Each sleeve shall be Schedule 40 galvanized steel, ductile iron or cast iron pipe and shall extend through its respective wall or floor and be cut flush with each wall surface. Sleeves shall provide required clearance between the pipe and the sleeve per NFPA 13. The space between the sleeve and the pipe shall be firmly packed with mineral wool insulation. Where pipes penetrate fire walls, fire partitions, or floors, pipes shall be fire stopped in accordance with Section 07840A FIRESTOPPING.

In penetrations that are not fire-rated or not a floor penetration, the space between the sleeve and the pipe shall be sealed at both ends with plastic waterproof cement that will dry to a firm but pliable mass or with a mechanically adjustable segmented elastomer seal.

3.4.8 Escutcheons

Escutcheons shall be provided for pipe penetration of ceilings and walls. Escutcheons shall be securely fastened to the pipe at surfaces through which piping passes.

3.4.9 Inspector's Test Connection

Unless otherwise indicated, test connection shall consist of 1 inch pipe connected at the riser as a combination test and drain valve; a test valve located approximately 7 feet above the floor; a smooth bore brass outlet equivalent to the smallest orifice sprinkler used in the system; and a painted metal identification sign affixed to the valve with the words "Inspector's Test." The discharge orifice shall be located outside the building wall directed so as not to cause damage to adjacent construction or landscaping during full flow discharge.

3.4.10 Drains

Main drain piping shall be provided to discharge [at a safe point outside the building] [at the location indicated]. Auxiliary drains shall be provided as indicated and as required by NFPA 13. When the capacity of trapped sections of pipe is less than 3 gallons, the auxiliary drain shall consist of a valve not smaller than 1/2 inch and a plug or nipple and cap. When the capacity of trapped sections of piping is more than 3 gallons, the auxiliary drain shall consist of two 1 inch valves and one 2 x 12 inch condensate nipple or equivalent, located in an accessible location. Tie-in drains shall be provided for multiple adjacent trapped branch pipes and shall be a minimum of 1 inch in diameter. Tie-in drain lines shall be pitched a minimum of 1/2 inch per 10 feet.

3.4.11 Installation of Fire Department Connection

Connection shall be mounted on the exterior wall approximately 3 feet above finished grade. The piping between the connection and the check valve shall be provided with an automatic drip in accordance with NFPA 13 and arranged to drain to the outside.

3.4.12 Identification Signs

Signs shall be affixed to each control valve, inspector test valve, main drain, auxiliary drain, test valve, and similar valves as appropriate or as required by NFPA 13. Hydraulic design data nameplates shall be permanently affixed to each sprinkler riser as specified in NFPA 13.

3.5 UNDERGROUND PIPING INSTALLATION

The fire protection water main shall be laid, and joints anchored, in accordance with NFPA 24. Minimum depth of cover shall be 4'0". The supply line shall terminate inside the building with a flanged piece, the bottom of which shall be set not less than 6 inches above the finished floor. A blind flange shall be installed temporarily on top of the flanged piece to prevent the entrance of foreign matter into the supply line. A concrete thrust block shall be provided at the elbow where the pipe turns up toward the floor. In addition, joints shall be anchored in accordance with NFPA 24 using pipe clamps and steel rods from the elbow to the flange above the floor and from the elbow to a pipe clamp in the horizontal run of pipe. Buried steel components shall be provided with a corrosion protective coating in accordance with AWWA C203. Piping more than 5 feet outside the building walls shall meet the requirements of Section 02510A WATER DISTRIBUTION SYSTEM.

3.6 ELECTRICAL WORK

Except as modified herein, electric equipment and wiring shall be in accordance with Section 16415A ELECTRICAL WORK, INTERIOR. Alarm signal wiring connected to the building fire alarm control system shall be in accordance with Section 13851A FIRE DETECTION AND ALARM SYSTEM, ADDRESSABLE.

3.7 DISINFECTION

After all system components are installed and hydrostatic test are successfully completed, each portion of the sprinkler system to be disinfected shall be thoroughly flushed with potable water until all entrained dirt and other foreign materials have been removed before introducing chlorinating material. Flushing shall be conducted by removing the flushing fitting of the cross mains and of the grid branch lines, and then back-flushing through the sprinkler main drains. The chlorinating material shall be hypochlorites or liquid chlorine. Water chlorination procedure shall be in accordance with AWWA M20. The chlorinating material shall be fed into the sprinkler piping at a constant rate of 50 parts per million (ppm). A properly adjusted hypochlorite solution injected into the system with a hypochlorinator, or liquid chlorine injected into the system through a solution-fed chlorinator and booster pump shall be used. Chlorination application shall continue until the entire system is filled. The water shall remain in the system for a minimum of 24 hours. Each valve in the system shall be opened and closed several times to ensure its proper disinfection. Following the 24-hour period, no less than 25 ppm chlorine residual shall remain in the system. The system shall then be flushed with clean water until the residual chlorine is reduced to less than one part per million. Samples of water in disinfected containers for bacterial examination will be taken from several system locations which are approved by the Contracting Officer. Samples shall be tested for total coliform organisms (coliform bacteria, fecal coliform, streptococcal, and other bacteria) in accordance with AWWA EWW. The testing method shall be either the multiple-tube fermentation technique or the membrane-filter technique. The disinfection shall be repeated until tests indicate the absence of coliform organisms (zero mean coliform density per 100 milliliters) in the samples for at least 2 full days. The system will not be accepted until satisfactory bacteriological results have been obtained. After successful completion, verify installation of all sprinklers and plugs and pressure test the system.

3.8 PIPE COLOR CODE MARKING

Color code marking of piping shall be as specified in Section 09900 PAINTS AND COATINGS.

3.9 PRELIMINARY TESTS

The system, including the underground water mains, and the aboveground piping and system components, shall be tested to assure that equipment and components function as intended. The underground and aboveground interior piping systems and attached appurtenances subjected to system working pressure shall be tested in accordance with NFPA 13 and NFPA 24. Upon completion of specified tests, the Contractor shall complete certificates as specified in paragraph SUBMITTALS.

3.9.1 Underground Piping

3.9.1.1 Flushing

Underground piping shall be flushed in accordance with NFPA 24. This includes the requirement to flush the lead-in connection to the fire protection system at a flow rate not less than the calculated maximum water demand rate of the system.

3.9.1.2 Hydrostatic Testing

New underground piping shall be hydrostatically tested in accordance with NFPA 24. The allowable leakage shall be measured at the specified test pressure by pumping from a calibrated container. The amount of leakage at the joints shall not exceed 2 quarts per hour per 100 gaskets or joints, regardless of pipe diameter.

3.9.2 Aboveground Piping

3.9.2.1 Hydrostatic Testing

Aboveground piping shall be hydrostatically tested in accordance with NFPA 13 at not less than 200 psi or 50 psi in excess of maximum system operating pressure and shall maintain that pressure without loss for 2 hours. There shall be no drop in gauge pressure or visible leakage when the system is subjected to the hydrostatic test. The test pressure shall be read from a gauge located at the low elevation point of the system or portion being tested.

3.9.2.2 Backflow Prevention Assembly Forward Flow Test

Each backflow prevention assembly shall be tested at system flow demand, including all applicable hose streams, as specified in NFPA 13. The Contractor shall provide all equipment and instruments necessary to conduct a complete forward flow test, including 2.5 inch diameter hoses, playpipe nozzles, calibrated pressure gauges, and pitot tube gauge. The Contractor shall provide all necessary supports to safely secure hoses and nozzles during the test. At the system demand flow, the pressure readings and pressure drop (friction) across the assembly shall be recorded. A metal placard shall be provided on the backflow prevention assembly that lists the pressure readings both upstream and downstream of the assembly, total pressure drop, and the system test flow rate. The pressure drop shall be compared to the manufacturer's data.

3.9.3 Testing of Alarm Devices

Each alarm switch shall be tested by flowing water through the inspector's test connection. Each water-operated alarm devices shall be tested to verify proper operation.

3.9.4 Main Drain Flow Test

Following flushing of the underground piping, a main drain test shall be made to verify the adequacy of the water supply. Static and residual pressures shall be recorded on the certificate specified in paragraph SUBMITTALS. In addition, a main drain test shall be conducted each time after a main control valve is shut and opened.

3.10 FINAL ACCEPTANCE TEST

Final Acceptance Test shall begin only when the Preliminary Test Report has

been approved. The Fire Protection Specialist shall conduct the Final Acceptance Test and shall provide a complete demonstration of the operation of the system. This shall include operation of control valves and flowing of inspector's test connections to verify operation of associated waterflow alarm switches. After operation of control valves has been completed, the main drain test shall be repeated to assure that control valves are in the open position. In addition, the representative shall have available copies of as-built drawings and certificates of tests previously conducted. The installation shall not be considered accepted until identified discrepancies have been corrected and test documentation is properly completed and received.

3.11 ON-SITE TRAINING

The Fire Protection Specialist shall conduct a training course for operating and maintenance personnel as designated by the Contracting Officer. Training shall be provided for a period of 2-4 hours of normal working time and shall start after the system is functionally complete but prior to the Preliminary Tests and Final Acceptance Test. The On-Site Training shall cover all of the items contained in the approved Operating and Maintenance Instructions.

-- End of Section --

SECTION 14210A

ELEVATORS, ELECTRIC
08/01

PART 1 GENERAL

NOTE: THIS SPECIFICATION SECTION CONTAINS INFORMATION REGARDING THE MAIN ELEVATOR (AND RELATED ACCESSORIES) AS WELL AS THE PLATFORM LIFTS (AND RELATED ACCESSORIES). INFORMATION REGARDING "ELEVATORS" IS TO APPLY TO THE MAIN ELEVATOR AND THE PLATFORM LIFTS AS WELL WHERE APPROPRIATE.

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 176	(1999) Stainless and Heat-Resisting Chromium Steel Plate, Sheet, and Strip
ASTM A 366/A 366M	(1997e1) Steel, Sheet, Carbon, Cold-Rolled, Commercial Quality
ASTM A 568/A 568M	(1998e1) Steel, Sheet, Carbon, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled
ASTM A 569/A 569M	(1998) Commercial Steel (CS) Sheet and Strip, Carbon (0.15 Maximum Percent), Hot-Rolled
ASTM A 666	(1999) Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar
ASTM E 84	(1999) Surface Burning Characteristics of Building Materials

ASME INTERNATIONAL (ASME)

ASME A17.1	(1998a) Safety Code for Elevators and Escalators
ASME A17.2.1	(1997a) Inspectors' Manual for Electric Elevators
ASME QE1-1	(1997) Standard for the Qualification of Elevator Inspectors

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

36 CFR 1191	Americans with Disabilities Act (ADA)
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Accessibility Guidelines for Buildings and
Facilities

U.S. ARMY CORPS OF ENGINEERS (USACE)

TI 809-04 (1998) Seismic Design for Buildings

U.S. GENERAL SERVICES ADMINISTRATION (GSA)

FED-STD 795 (Basic) Uniform Federal Accessibility
Standards

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE C62.11 (1999) IEEE Standard Metal-Oxide Surge
Arresters for AC Power Circuits

IEEE C62.41 (1991; R 1995) Surge Voltages in
Low-Voltage AC Power Circuits

IEEE C62.45 (1992) IEEE Guide on Surge Testing for
Equipment Connected to Low-Voltage AC
Power Circuits

IEEE Std 304 (1977; R 1991) Test Procedure for
Evaluation and Classification of
Insulation Systems for Direct-Current
Machines

INTERNATIONAL CONFERENCE OF BUILDING OFFICIALS (ICBO)

ICBO Building Code (1997) Uniform Building Code (3 Vol.)

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA LD 3 (1995) High-Pressure Decorative Laminates

NEMA MG 1 (1998) Motors and Generators

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70 (1999) National Electrical Code

NFPA 252 (1999) Fire Tests of Door Assemblies

UNDERWRITERS LABORATORIES (UL)

UL 1449 (1996; Rev thru Dec 1999) Transient
Voltage Surge Suppressors

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Elevator System

Detail drawings including dimensioned layouts in plan and elevation showing the arrangement of elevator equipment, anchorage of equipment, clearances for maintenance and operation; and details on hoistway, doors and frames, operation and signal stations, controllers, motors, guide rails and brackets, and points of interface with normal power fire alarm system HVAC or exhaust systems and interface with emergency power systems. Drawings shall show any revised building electrical system required to make supplied elevator system function as specified. Drawings shall contain complete wiring diagrams showing electrical connections and other details required to demonstrate sequence of operation and functions of system devices. Drawings shall include the appropriate sizing of electrical protective devices which are frequently different from National Electrical Code standard sizes.

SD-03 Product Data

Training Data

Information describing the training course for operating personnel, training aids and samples of training aids and samples of training materials to be used, training schedules, and notification of training.

Elevator System

A complete list of equipment and material, including illustrations, schedules, manufacturer's descriptive data and technical literature, performance charts, catalog cuts, installation instructions, brochures, diagrams, and other information required for fabrication and installation of the equipment. Data shall include calculations for reaction loads imposed on building by elevator systems. Calculations to demonstrate compliance with ASME A17.1, Rule XXIV, and to demonstrate that the proposed elevator system conforms to paragraph SEISMIC REQUIREMENTS; certified copies of test reports may be submitted on lieu of calculations. Spare parts data for each different item of material and equipment specified, after approval of detail drawings and not later than 3 weeks prior to date of beneficial occupancy. Data shall include a complete list of parts and supplies, with current unit prices and source of supply, and a list of parts recommended to be replaced and replacement interval required. Data shall include the appropriate sizing of electrical protective devices.

Framed Instructions

Diagrams, instructions, and other sheets, proposed for posting.

Test Procedures

A plan detailing the testing procedures shall be submitted 60 days prior to performing the elevator tests.

SD-04 Samples

Finishes

Samples of materials and products requiring color or finish selection.

SD-06 Test Reports

Testing

Test reports in booklet form showing all field tests performed to adjust each component and all field tests performed to prove compliance with the specified performance criteria, upon completion and testing of installed system.

SD-07 Certificates

Qualification Certificates

Certificates of experience of elevator mechanics employed to install, supervise and test the elevator shall certify mechanics to have not less than 5 years experience installing, supervising and testing elevators of the type and rating specified. Certificate shall certify that elevator system installer is acceptable to elevator manufacturer, prior to installation of elevators.

SD-10 Operation and Maintenance Data

Elevator System

Six copies of operation manual outlining the step-by-step procedures for system startup, operation and shutdown. Manuals shall include manufacturer's name, model number, service manual parts list and brief description of all equipment, including basic operating features. Six copies of maintenance manual listing routine maintenance procedures, possible breakdowns and repairs, and troubleshooting guides. Manuals shall include equipment layout and complete wiring and control diagrams of the system as installed. Operation and maintenance manuals shall be approved prior to training course.

1.3 QUALIFICATIONS

Electric elevators shall be pre-engineered elevator systems, and provided by a company regularly engaged in the manufacture of elevator systems. The manufacturer shall either install the elevator system or provide letter of endorsement certifying that the elevator-system installer is acceptable to the manufacturer.

1.4 REGULATORY REQUIREMENTS

Design and fabrication shall be in accordance with ASME A17.1. Each car shall have the capacity to lift a live load, exclusive of the car and cable at a speed as specified in the following schedule. The approximate travel, terminal floors, number of stops and openings, and the car sizes shall be as shown in the schedule. The elevators shall serve the floors with stops and openings in accordance with the requirements indicated. Passenger elevators shall provide accessibility and usability for physically handicapped in accordance with the requirements for the handicapped in

FED-STD 795 and 36 CFR 1191.

1.4.1 Elevator Schedule (Passenger)

Number of Elevators Required:	1.
Type:	Geared.
Service:	Passenger.
Capacity:	4000 pounds.
Speed:	400 fpm.
Platform Size:	7'-0" wide by 6'-0" deep.
Net Travel:	64 feet.
Landings:	6.
Openings: Front	6.
Openings: Rear	0.
Entrance Type:	Center-opening horizontal sliding Single speed horizontal sliding.

1.4.2 Platform Lift

Number of Lifts Required:	2.
Capacity:	750 pounds.
Speed:	10 fpm.
Alcove Size:	54" wide by 48" deep.
Clear Car Inside:	approx. 48" wide by 40" deep.
Net Travel:	2.88 feet.
Landings:	1.
Openings: Front	1.
Openings: Rear	1.

1.5 DESIGNATED LANDING

For the purposes of firefighter's service and emergency operations, as required by Section 211, ASME A17.1, the designated landing or level shall be the basement. The alternate landing or level shall be the first floor.

1.6 DELIVERY AND STORAGE

All equipment delivered and placed in storage shall be stored with protection from the weather, excessive humidity and excessive temperature variations; and dirt, or other contaminants.

1.7 FIELD MEASUREMENTS

The Contractor shall become familiar with all details of the work, verify all dimensions in the field and advise the Contracting Officer of any discrepancy before performing any work.

1.8 WARRANTY

Warranty service shall be provided for each elevator for a period of 12 months after date of acceptance by Contracting Officer. Warranty service shall be performed only by trained elevator mechanics during regular working hours, and shall include manufacturer's warranty requirements including but not limited to adjusting, labor and parts needed to keep the elevator in proper operation. Testing and adjustments shall be in accordance with the applicable provisions of ASME A17.1 and ASME A17.2.1. Emergency callback service shall be included and available 24 hours a day, 7 days per week, with an initial telephone response time of one hour and a response time of 4 hours for a mechanic to the site. Inspection and service for fire service operation shall be performed every 6 months. Documentation of inspection and testing, and certification of successful operation shall be provided with each visit.

PART 2 PRODUCTS

2.1 GENERAL EQUIPMENT REQUIREMENTS

2.1.1 Standard Products

Material and equipment shall be the standard products of manufacturers regularly engaged in the fabrication of elevators and/or elevator parts, and shall essentially duplicate items which have been in satisfactory use for at least 2 years prior to bid opening. Equipment shall be supported by a service organization that is available 24 hours a day, 7 days per week, with a response time of 4 hours.

2.1.2 Nameplates

Each major item of equipment shall have the manufacturer's name, address, type or style, model or serial number, catalog number, and electrical and mechanical characteristics on a plate secured to the item of equipment.

2.1.3 Special Tools

One set of special tools, calibration devices, and instruments required for operation, calibration, and maintenance of the equipment shall be provided.

2.1.4 Electrical Work

Changes to the electrical distribution system required for coordination with elevator equipment shall be performed and coordinated by the Contractor, at Contractor's expense. Electrical service for elevator machines shall be 60-Hertz, 3-phase, 4 wire solid neutral grounded alternating current. The elevator machine feeder for each elevator shall have a circuit breaker or fused disconnect switch located in the elevator machine room, and shall terminate at the control panel for that elevator. (The lift machine feeder for each platform lift shall have a circuit breaker or fused disconnect switch.) Electrical work shall conform to requirements in Section 16415 ELECTRICAL WORK, INTERIOR. A feeder with

circuit breaker or fused disconnect switch located in the elevator machine room, shall be terminated at the control panel for each elevator. (A feeder with circuit breaker or fused disconnect switch shall be located near each platform lift.) A telephone junction box and an elevator car lighting junction box shall be provided adjacent to each controller. A single-phase electrical circuit with grounded connection for video monitor shall be provided in machine room. A disconnect switch that will shutoff power to the elevator car lighting shall be provided in the elevator machine room adjacent to the elevator control panel.

2.1.5 Use of Asbestos Products

Materials and products required for manufacturing and installing elevators shall not contain asbestos.

2.2 MISCELLANEOUS MATERIALS

2.2.1 Materials for Car Enclosures

Materials for car enclosures shall meet flame spread rating 0 to 75 and smoke development 0 to 450 as tested in accordance with requirements of ASTM E 84 and as established by ASME A17.1, Rule 204.2.

2.2.2 Structural Steel

Structural steel shall be hot-rolled commercial quality carbon steel, pickled, oiled, complying with ASTM A 569/A 569M and ASTM A 568/A 568M.

2.2.3 Cold-Rolled Sheet Steel

Sheet steel shall be cold-rolled commercial quality low-carbon steel, Class 1, exposed matte finish, oiled, complying with ASTM A 366/A 366M and ASTM A 568/A 568M.

2.2.4 Stainless Steel

Stainless steel shall be ASTM A 176 Type 302/304, austenitic, corrosion-resistant with grain of belting in direction of longest dimension. Surfaces shall be smooth and without waves and shall be in compliance with ASTM A 666 and ASTM A 568/A 568M.

2.3 PASSENGER ELEVATOR CAR

2.3.1 Car Fronts

Fronts for passenger elevators shall be combination door post and return panels manufactured of 14 gauge stainless steel provided with necessary cutouts for operating devices. Operating panel shall be recessed into front return panel with surface-applied operating panel cover. Position indicator in front return shall be recessed with a surface-applied cover plate. Exposed stainless steel shall be finished with No. 4 Satin Finish, unless otherwise specified.

2.3.2 Car Doors

Car doors for passenger elevators shall be constructed from 16 gauge sheet steel and stainless steel cladding. Each door shall be sound-deadened and reinforced to receive required operating mechanism and hardware, and have two removable door guides per panel. Seams, screws or binding strips shall

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not be visible from within the car. Threshold shall be extruded aluminum with grooves for door guides. Exposed stainless steel shall be finished with No. 4 Satin Finish. Car doors shall be equipped with a proximity-type infrared car door protective device having the following operation:

- a. When doors are in full-open position, doors shall be unable to initiate closing if a person comes within the detection zone. The detection zone moves with the doors, so that if a person or object enters the zone after the doors have begun to close, the doors shall stop, then reverse to reopen. The doors shall reclose after a brief time. A passenger entering or leaving the cars shall not cause the doors to reopen unless the doors reach a predetermined proximity to the passenger.
- b. After a stop is made, the doors shall remain open for a time to permit passenger transfer, after which they shall close automatically. This time interval shall be less for a car call than for a hall call or a coincident car/hall call.
- c. If there is either a hall call or a car call in the car and the doors are prevented from closing within an interval of 0 to 30 seconds, the door protective device shall be rendered inoperative, a buzzer shall sound in the car and the doors shall close at approximately half speed. Normal door operation shall resume at the next landing reached by the car.
- a. Hoistway door closure shall lead car-door closure; car-door opening shall lead hoistway-door opening.
- b. Opening of car door shall begin when car is in last foot of travel before stopping; hoistway door opening shall not begin until car is stopped.
- c. Upon initial opening, doors remain open for a predetermined interval, adjustable from 0 to 8 seconds.
- d. DOOR OPEN buttons shall open doors unless elevator is in motion. DOOR CLOSE button is supplementary to automatic closure of doors when a call button is pressed.
- e. Pressing DOOR OPEN button shall temporarily open doors unless car is moving. Pressing DOOR CLOSE button shall close doors, subject to door-edge controls specified.
- f. Door closing reverses when: using DOOR OPEN button, car door safety edge activates, or when light sensors are interrupted.
- g. Upon initial interruption of photoelectric light beam, door reclosing time shall become shorter at a predetermined interval, adjustable from 0 to 4 seconds.
- h. Should either light beam be interrupted while doors are closing, doors shall return to open position, reclosing again after a predetermined interval.

Doors shall operate smoothly in both directions and shall be cushioned to stop at full-open and full-closed positions. Doors shall open and close with average speed of 2-1/2 fps.

Door operations shall be integrated with car-leveling system to prevent elevator movement before doors close.

2.3.3 Car Platform

Car platform for passenger elevators shall be fabricated from steel plates secured to a steel frame. Steel car platforms shall be assembled into a one-piece platform with top and bottom steel plates welded to structural steel frame and covered with felt and sound-isolation.

2.3.4 Walls

Walls for passenger elevators shall be 7 feet 11-1/2 inches high from floor to the underside of lighting fixtures. Side and rear panels shall be 16 gauge sheet steel panels. Lower portion of side and rear wall panels shall be provided with a 12 gauge stainless steel wainscoting from top of car base to a point 2 inches above top of handrail. Panels shall be mounted on car walls in a manner permitting their reversing. Panels shall be evenly spaced with not less than two panels on each side and three panels at the rear with 3/8 inch separations backed up with stainless steel dividers. Vent around base shall be provided.

Finish for stainless steel shall be ASM-01 No. 6.

Base of car shall be 6 inch high, 14 gage corrosion-resistant steel.

Provide vents to exhaust ventilation system air.

Front return panel, transom and entrance columns shall be constructed of stainless steel with ASM-01 No. 4 brushed finish. Provide integral swing return car operating devices.

Sill shall be extruded aluminum.

Provide freight pads for all cab walls and associated hooks for attachment.

2.3.5 Car Top, Ceiling and Light Fixtures

Car top for passenger elevators shall be manufactured from 12 gauge sheet steel and shall be not less than 5-1/2 inches high with drop-ceiling and light fixtures. Ceiling shall be 1/8 inch thick translucent white plastic fire-retardant light diffuser supported by polished aluminum perimeter frame and dividers to form the drop-ceiling light fixture. Light fixtures shall be fluorescent type, flush with car ceiling, manufactured of sheet steel with flange and enclosed sides and top, baked-enamel reflector, mounted directly to outlet box. Bottom of fixtures shall be flush with car ceiling. Fluorescent light fixtures shall be dual lamp with quick-starting high-power factor, Class P ballasts, with safety lamp guard clamps on fluorescent tubes. Light level shall average at least 10 footcandles measured at the car threshold with the door closed. Part of car light fixture shall be removable to permit use of the emergency exit in top of car.

Provide illuminating position indicator panels above door.

2.3.6 Emergency Exit

Car top for passenger elevators shall be manufactured with a hinged emergency exit panel of 12 gauge steel which opens up to clear the crosshead and car door operator. Emergency exit panel shall be hinged and held in place with nonremovable fastening devices at each corner, and manually openable from top of car and key-operable from inside. A minimum of 2 sides of exit panel shall lap the exit opening by 1 inch. Exits shall be equipped with electrical contacts which will prevent operation of car when exit door is open and cause the alarm bell to ring.

2.3.7 Floor Finish

Floor finish for passenger elevators shall be finished with resilient tile flooring not less than 3/16 inch thick or flexible-type homogeneous vinyl tile not less than 1/8 inch thick as specified in Section 09650 RESILIENT FLOORING. Tile shall be laid flush with the extruded aluminum platform threshold.

2.3.8 Base

Base for passenger elevators shall be cove type stainless steel, 6 inches high.

2.3.9 Handrails

Handrails for passenger elevators shall be mounted on each wall and rear and shall comply with ASME A17.1, FED-STD 795 and 36 CFR 1191. The handrails shall be turned back to wall.

Handrails shall be continuous 2 inch stainless steel bar around sides and back. Rails shall be attached to car body with stainless steel brackets.

2.3.10 Exhaust Fan

Exhaust fan for passenger elevators shall be 2-speed exhaust type ventilating unit mounted in car ceiling and shall be provided with a stainless steel grille. Units shall be suitably isolated from car ceiling and shall provide at top speed a minimum of 6 air changes per hour for car volume and car occupancy. Switches for the operation of exhaust unit shall be located in car station locked cabinet or key-switched.

2.3.11 Communications

A telephone system in stainless steel cabinet shall be provided. A vandal-resistant speaker type intercom with push-button to activate shall be installed in car station behind a stainless steel perforated grille.

For vandalism reasons, the telephone shall be activated from outside the car. Means to activate the telephone from within the car shall not be provided.

2.3.12 Car Emergency Lighting System

Emergency car lighting system for passenger elevators shall consist of an emergency power pack on top of elevator and a remote lighting fixture inside elevator car located in car operating panel.

2.3.12.1 Power Pack

Power pack shall be sealed gel cell type, with solid state controls and regulating charger connected to normal power supply. Power pack shall provide one hour emergency bell operation and four hours of continuous illumination. Power pack unit shall contain the following:

- a. Minimum 6 inch diameter alarm bell connected to the elevator alarm and emergency push-button.
- b. Top of car light fixture with protective wire guard.
- c. Testing circuit and pilot light.
- d. Low-wattage pilot light indicator.
- e. Battery low-voltage disconnect.

2.3.12.2 Emergency Light Fixture

Emergency light fixture for passenger elevators shall be located in car station inside elevator car, with flush-mounted lens and shall consist of the following:

- a. A minimum of two lamps capable of providing a minimum level of illumination of 1.0 footcandle at a point 2 feet above the floor, 1 foot in front of car station.
- b. Fixture frame of stainless steel.
- c. Frosted acrylic lenses, 1/4 inch thick.

2.3.12.3 Remote Light Fixture

Upon interruption of normal power, remote light fixture shall automatically and immediately illuminate and permit operation of the bell, subject to the activation of the emergency stop-switch or alarm button. Emergency power pack shall be capable of providing a minimum of 1 hour emergency bell operation and 4 hours of continuous illumination.

2.3.13 Protection Pads

Car shall be provided with wall protection pads, with inconspicuous stainless steel pad hooks spaced not over 18 inches apart near ceiling. Pads shall be heavy quality fire-retardant treated canvas with two layers of sewn cotton batting with metal eyelets for each pad hook. Pads shall cover the entire wall surface except operating devices. Pads shall be flame retardant in accordance with ASME A17.1 (Rule 204.2).

2.3.14 Certificate Frame

A stainless steel certificate frame with translucent plexiglass lens of the appropriate size to receive certificate issued by inspecting agency shall be provided for passenger elevators. Frame shall be engraved to show name of elevator manufacturer, carrying capacity in pounds and maximum number of persons allowed.

2.3.15 Car and Counterweight Guides and Guide Shoes

Roller guides shall consist of minimum 3 tires mounted on top and bottom of

car and counterweight frame. Roller guides shall be held in contact with guide rail by adjustable devices and shall run on dry, unlubricated rails.

2.3.16 Car Guide Rails

Guide rails shall be planed steel tee or omega shaped sections with structural channel rail backing as required, tongue-and-groove matched joints reinforced with fitted splice plates. Guide rails shall extend from bottom of pit to underside of roof over hoistway.

2.4 PLATFORM LIFT

2.4.1 Car Front

Fronts for lift shall be combination door post and return panels manufactured of 14 gauge stainless steel provided with necessary cutouts for operating devices. Operating panel shall be recessed into front return panel with surface-applied operating panel cover. Position indicator in front return shall be recessed with a surface-applied cover plate. Exposed steel shall be finished with rust-inhibitive primer and baked-enamel (burgandy color).

2.4.2 Car Door

Car doors for lift shall be constructed from 16 gauge sheet steel. Each door shall be sound-deadened and reinforced to receive required operating mechanism and hardware, and have two removable door guides per panel. Seams, screws or binding strips shall not be visible from within the car. Threshold shall be extruded aluminum with grooves for door guides. Exposed steel shall be finished with rust-inhibitive primer and baked-enamel (burgandy color). Car doors shall be equipped with a proximity-type infrared car door protective device having the following operation:

2.4.3 Car Platform

Car platform for lift shall be fabricated from steel plates secured to a steel frame. Steel car platforms shall be assembled into a one-piece platform with top and bottom steel plates welded to structural steel frame and covered with felt and sound-isolation.

Car platform shall be finished with VCT flooring to match surrounding area.

2.4.4 Car Walls

Walls for lift shall be 48 inches high. Side panels shall be 16 gauge sheet steel panels.

Exposed steel shall be finished with rust-inhibitive primer and baked-enamel (burgandy color).

2.4.5 Electrical and Guides

Motor: 1 HP, 1725 RPM, 120 VAC, 60 HZ, 10 AMPS, single phase, instant reversing. located at top of tower.

Limit Switches: Up and down limit switches with a final limit to disconnect main power in the event of an overrun.

Controls: Up/Down paddle switch on

platform and at landings. Keyswitch, alarm, and emergency stop switch.

Guiding Means: Monorail "C" channel with
captivated trolley and safeties.

2.5 PASSENGER ELEVATOR HOISTWAY ENTRANCES

2.5.1 Hoistway Doors

Hoistway doors shall be designed and fabricated as part of a Class B 1-1/2 hour fire-rated door/frame assembly to meet requirements of NFPA 252 and shall bear the label of an approved testing laboratory. Door panels shall be hollow metal type with plain panel design, not less than 1-1/4 inches thick with 16 gauge face sheet-steel and stainless steel cladding with 16 gauge sight guards. Each door shall be reinforced with continuous vertical members and filled with sound-deadening material. Doors shall be reinforced to accept the required operating mechanism and hardware. Doors shall have 2 removable door guides per panel. Seams, binding strips or screws shall not be visible from landing. Exposed stainless steel shall be finished with No. 4 Satin Finish, unless otherwise specified.

2.5.2 Hoistway Frames

Hoistway frames for passenger elevators shall be designed and fabricated as part of a Class B 1-1/2 Hour fire-rated door/frame assembly to meet requirements of NFPA 252 and shall bear the label of an approved testing laboratory. Frames for passenger elevators shall be formed 14 gauge and stainless steel cladding with head and jamb in flush alignment and corners welded and ground smooth. Head and jamb section shall be bolted assembly with bolts, washer and locking nut or lock washer. Frame assembly shall be securely fastened to structure. Frames shall return to wall. Exposed stainless steel shall be finished with No. 4 Satin Finish, unless otherwise specified.

2.5.3 Symbols

Raised stainless steel symbols as required by FED-STD 795 and 36 CFR 1191 (burgandy color), shall be provided at each floor to indicate the floor location. Symbols shall be attached with concealed fasteners. Symbols shall be placed in a location which can be seen by passengers from the opened passenger doors.

2.5.4 Sills

Sills shall be extruded aluminum with slip-resistant surface and machined grooves for door guides, secured to floor beams.

2.5.5 Strut Angles

shall be structural steel of size not less than 3 x 3 x 3/16 inch extending from sill to beam above and anchored to building structure with structural steel fastenings and bracings of structural members with a cross section of not less than strut angles.

2.5.6 Door Hangers and Housing

Each door panel shall be provided with not less than 2 sheave-type hangers

designed for required door operation. Hanger housing and support shall be fabricated from formed Z-shaped steel angles of size not less than 3/16 inch thick bolted to strut angles.

2.5.7 Door Rollers

Door rollers shall be constructed with grease-packed ball-bearings and shall be tired with a sound-reducing material. Diameter of rollers shall be not less than 3-1/4 inches for car doors and not less than 2-1/4 inches for hoistway doors. Upward thrust shall be taken by a hardened and ground ball-bearing roller assembled on an eccentric stud to provide adjustment.

2.5.8 Hanger Track

Hanger track shall be of high carbon cold-drawn steel, round at top to receive door rollers, and round at bottom to receive up-thrust rollers, of size engineered to accommodate load requirements.

2.5.9 Covers and Guards

Hanger covers, dust covers, toe guards, and fascia plate shall be fabricated from 16 gauge reinforced steel and finished with baked-enamel. Hanger covers shall extend the full door travel and shall be mounted in sections for ease of servicing door hangers. Dust covers shall be provided over top terminal landing door only and shall be secured to hanger housing and building structure. Toe guards shall be secured to sill. Fascia plates shall be provided between each door hanger housing and sill.

2.6 PASSENGER ELEVATOR DOOR OPERATION

Car and hoistway doors for passenger elevators shall be operated simultaneously by an electric door operator. Doors shall operate smoothly in the opening direction and closing direction and be electrically cushioned to stop at both the full-open and full-closed position. Operators shall be high speed direct current, heavy-duty type providing an average door opening speed of 2-1/2 feet per second. Car and hoistway doors shall be opened and closed simultaneously in a maximum time of 4.3 seconds for the full open-to-closed cycle. When on automatic operation the door closing time shall not exceed 2.5 seconds and door closing force shall not exceed 30 pounds. Reversal of the doors when closing shall be accomplished by the "DOOR OPEN" button, or interception of the photoelectric light beams. Doors shall be arranged so that doors can be opened manually in the event of power failure.

2.7 PASSENGER ELEVATOR OPERATING AND SIGNAL FIXTURES

2.7.1 General

Elevator fixtures and panels for passenger elevators shall be constructed of 1/8 inch thick faceplates in swing return of stainless steel. Fastenings for all exposed fixtures shall be secured with tamper-proof spanner-head screws of same material and finish as fixture. Hall and car-call buttons shall be of the call register type with a low-voltage power supply not to exceed 48 volts. Pressure on a button shall illuminate button to indicate that a call in the desired direction has been registered. Car and hall fixtures shall be designed and located at the prescribed height to accommodate the handicapped in accordance with FED-STD 795 and 36 CFR 1191. Handicapped markings shall be integral with faceplate in accordance with FED-STD 795 and 36 CFR 1191. Surface-applied markings

are unacceptable. Engraving shall be black filled except for fire service identification which shall be red filled. Operating and signal fixture contacts and lamps shall be completely enclosed in steel boxes finished with baked-enamel. Boxes for hall landing devices shall be equipped for proper adjustment to wall. Lamps shall be installed in light-tight compartments. Cover plates shall be provided with rubber gaskets when exposed to weather or harmful contaminants. Replacement bulbs shall be readily available from 3 sources.

2.7.2 Car Operating Panel

Car operating panel for passenger elevators shall be provided with the necessary raised (0.03 inch) markings for the handicapped, and shall include a series of minimum 3/4 inch diameter push-buttons numbered to correspond to the floor served and various additional switches, buttons and light jewels, including emergency stop, alarm button, "DOOR OPEN" button, "DOOR CLOSE" button, and communication speaker. Operating buttons shall be vandal-resistant metal encased and embossed to permit illumination when a call is registered. Buttons shall be designed with 1/32 inch operating clearance to seat on faceplate in lieu of the button mechanism. Buttons shall have maximum protrusion of 3/16 inch beyond the faceplate and shall have beveled edges to prevent damage from side blows. Buttons and switches not required for automatic or fire service operation shall be key-operated and mounted on front-return car operating station. Elevator number and "NO SMOKING" shall be international symbol engraved on upper portion of car station. Operating panel in the car shall consist of a flush-mounted panel containing the following operating devices:

- a. "DOOR OPEN" button.
- b. "DOOR CLOSE" button.
- c. Key-operated car fan/light switch.
- d. Key-operated ventilating blower switch/call-light.
- e. Communication speaker phone, grille and push-to-call button.
- f. Emergency stop switch key-operated when operated will stop the car independently of normal stopping devices. Operation of emergency stop switch shall not cause any power variance or surge that may affect the operation or condition of the control panel or its components.
- g. Emergency signal-switch connected to a 6 inch diameter signal bell outside of elevator hoistway at Basement located as shown or as directed.
- i. Key-operated inspection switch which will render normal operation inoperative for the purpose of using the hoistway access switch.
- j. Key-operated fire service switch and light jewel.

2.7.3 Auxiliary Car Operating Panel

Auxiliary car operating panel shall be similar in design to main car panel, and shall include all devices necessary for automatic operation, such as emergency stop switch, alarm bell, door open button, and call car buttons.

2.7.4 Hall-Call Station

Hall-call operating devices for passenger elevators at landing shall consist of an "UP" push-button at bottom landing, a "DOWN" push-button at top landing and "UP" and "DOWN" push-buttons at all other landings. Push-buttons shall be vandal-resistant, metal encased and back-lighted to permit illumination when a call is registered. Buttons shall be designed with 1/32 inch operating clearance to seat on faceplate in lieu of the button mechanism. Buttons shall have maximum protrusion of 3/16 inch beyond the faceplate with beveled edges to prevent damage from side blows.

Provide one hall-call station per landing, located to the north side of the door entrance opening.

2.7.4.1 Fire Service Switch

Fire service switch for passenger elevators shall be located at the designated landing.

2.7.5 Direction Lanterns

Lanterns shall be in accordance with FED-STD 795 and 36 CFR 1191, and shall be provided at all floor landings and in each car entrance column. Lanterns shall be vandal-resistant design.

2.7.6 In-Car Position Indicator

Indicator numerals and directional arrows shall be 1 inch high white translucent plastic. As car travels through hoistway the car position shall be indicated by illumination of light jewel corresponding to landing at which the car is stopped or passing. Necessary light baffles shall be provided. Floor numerals and letters shall illuminate white. A position indicator of the digital-readout or dot-matrix type (minimum 2 inch high indication) shall be provided in car transom panel. Number corresponding to car position shall remain illuminated when motor drive is shut down. Illumination shall be shrouded in an approved manner to protect against glare from car lighting.

2.7.7 Audible Signals

An audible signal shall be provided at each floor landing and in each car and shall sound coincident with the lantern illumination indicators. The audible signal shall be no less than 20 decibels with a frequency no higher than 1500 Hz. The audible signal shall sound once for UP direction and twice for DOWN direction.

2.7.8 Combination Hall-Position Indicator and Directional Arrows

Combination hall-position indicator and directional arrows for passenger elevators shall be provided at Basement landing directly over entrance frame. As elevator travels in hoistway, elevator position shall be indicated by illumination in alpha-numeric characters corresponding to the landing where elevator is stopped or passing. Number corresponding to position of car shall remain illuminated when the motor drive is shut down.

An audible signal shall sound in the elevator car to indicate that the elevator car is stopping or passing a floor served by elevator. Fixture design and operation shall be similar in design to that specified for Car Position Indicator.

2.8 PASSENGER CAR OPERATION (SINGLE-CAR SELECTIVE/COLLECTIVE)

Car shall be arranged so that by pressing one or more car buttons the car will start automatically and stop at first floor for which the button has been pressed corresponding to the direction in which the car is traveling. Car shall stop in the order in which floors are reached by car at all floors for which calls have been registered, irrespective of the sequence in which buttons have been pressed, provided the button for a given floor has been pressed sufficiently in advance of car's arrival at that floor to permit the stop to be made. If car buttons have not been pressed, and car starts UP in response to several DOWN calls, car shall travel to highest DOWN call first and then reverse to collect other UP calls. UP calls shall be collected in the same way when car starts DOWN in response to UP calls by first stopping for the lowest UP call registered. When a car has stopped in response to the pressing of a landing button and a car button is pressed corresponding to the direction in which the car has been traveling, within a predetermined interval of time after the stop, car shall continue in that direction regardless of other landing calls registered. While car is in motion, landing calls in the opposite direction of car movement shall not affect operation of car but calls shall remain registered. After the last car call in the direction the car is traveling has been answered the car shall automatically reverse and answer registered landing calls and all car calls in the order the landings are reached. When all calls have been answered, the car shall travel to and stop at the first floor and shall have the doors closed.

2.9 AUTOMATIC EMERGENCY POWER OPERATION

Elevator control system shall be arranged to operate on emergency power supply upon failure of the normal power supply. Elevators shall operate as follows:

- b. Car shall automatically start and travel at full-rated speed to the designated landing stop, open the car and hoistway doors and then shut down.

2.10 AUTOMATIC ELEVATOR OPERATION

2.10.1 General

The operating device shall consist of a series of push-buttons in car numbered to correspond to various landings, "UP" and "DOWN" buttons at intermediate landings, and a single button at terminal landing. To meet the elevator operation requirements specified in this section, all buttons shall be connected electrically to the control system which governs the floor selection, car selection, direction of travel and governs the acceleration and retardation.

2.10.2 Operation

Car calls shall be registered within the car by pressing the button corresponding to the designated floors. Hall calls shall be registered by pressing buttons in the corridor push-button fixture. Once the demand for elevator service has been established and the car has received a start signal the car operation shall be as follows.

2.10.2.1 Door Closing

Doors shall close automatically. When doors are fully closed and the interlock circuit established, the car shall start to move in the direction established by control system. Car shall accelerate and decelerate automatically. Car shall stop at all floors for which car calls are registered in the order in which the floors are reached and shall stop for any corridor demands assigned to the cars in the order in which the floors are reached.

DOOR CLOSE button operation shall also close doors.

2.10.2.2 Door Opening

Doors shall open automatically as car reaches the landing. After a predetermined time the doors shall close and the car shall proceed to answer the remaining car or corridor calls. A protective device such as a light beam device shall be provided on car door and when activated will prevent closing of doors.

DOOR OPEN button operation shall also activate doors.

2.10.2.3 Car Dispatch

When car is not demanded it shall return to First Floor and await call.

When car is at First Floor and car does not receive a demand dispatch for an adjustable time period up to 10 minutes set initially at 5 minutes, the motor drive unit shall be switched off. If the car's switched-off motor drive unit receives a demand dispatch the motor drive unit shall automatically restart.

2.10.2.4 Door Dwell-Time

Door open dwell-times shall be adjustable so that the open time for a car call is shorter than the open time for corridor calls and second passengers. If a longer time is needed for passenger entry, doors can be prevented from closing or reversing by each of the following methods, which are to be provided: the light beam door control, the protective leading edge on car door, or by pressing "DOOR OPEN" button in car. Door dwell-times shall comply with FED-STD 795 and 36 CFR 1191.

2.10.3 Automatic Load Weighing

Passenger elevators shall be provided with load-weighing devices which will cause elevator to bypass hall calls when elevator is filled to an adjustable percentage. Corridor calls shall remain registered until the car load is lightened and the car is available to respond to the call.

2.10.4 Anti-Nuisance

Passenger elevators shall be provided with a system which will cancel all car calls in the event that between 3 and 5 times the number of car calls are registered as there are passengers in car, allowing 150 pounds per passenger.

2.10.5 Door Operation

Double-door operation shall not be permitted. If an UP traveling car has a passenger for an intermediate floor and a DOWN call is registered at that floor with no-calls above car, the car shall travel to floor, open the door

and let passenger out, then light the DOWN direction arrow in hall lantern and accept the waiting passenger who registered the DOWN call. Doors shall not perform the open-close cycle before elevator proceeds to next call.

2.10.6 Automatic Power Shutdown Upon Fire Sprinkler Activation

Automatic power shutdown of the elevators will be initiated by a waterflow switch supervising sprinklers located in the elevator machine room or in the elevator hoistway. Provide heat detectors which are fixed-temperature-rate-of-rise, rated at 135 to 140 degrees F adjacent to each sprinkler head in the hoistway(s) and in the machine room. Heat detectors shall be connected to the elevator control system which shall cause the following to the affected elevator(s), upon activation of the heat detector.

- a. Elevators which are in motion will proceed to the nearest available landing away from the fire floor, and shall cause power-operated doors to open and remain open until manually reset. The fire floor is considered the floor where the heat detector is located.
- b. Elevators which are standing at a landing with open doors will remain open at the floor. If power-operated doors are closed, the elevator will cause the doors to open.

2.11 FIREFIGHTERS' SERVICE

Firefighter service shall be in accordance with ASME A17.1 for automatic elevators. Provide smoke detectors at each of the Elevator Lobbies and Machine Room. Smoke detectors shall be powered from the building fire alarm control panel. Elevator lobby and machine room smoke detectors shall be in accordance with Section 13851 FIRE DETECTION AND ALARM SYSTEM, ADDRESSABLE.

2.12 ELEVATOR MACHINE (GEARED)

2.12.1 Hoisting Machine

Machine shall be worm-gear traction type with motor, brake, worm gearing, traction sheave and bearings mounted on common bed plate. Worm shall be of steel and integral with the worm shaft and shall be provided with a ball-thrust bearing with self-alignment blocks or preloaded thrust bearing designed to take the end thrust of the worm in both directions. Main gear shall be hobbled from a bronze rim accurately fitted and bolted to gear spider. Gears shall be fitted to minimize the noise, vibration and wear. Roller bearings shall be complete with drive sheave shaft and provisions for lubrication. Design and construction of equipment and parts subject to wear shall be completely repairable and replaceable.

2.12.2 Hoisting Ropes

Hoisting ropes shall be the independent wire-rope type, regular lay, preformed, non-coated, improved plow steel of 6 x 37 construction. Hoisting ropes shall be suited for service requirements to be provided. Hoisting rope connections shall be by tapered babbitted socket connections and shall be rated in strength equal to or greater than the strength rating of the rope. Hoisting ropes shall be selected so that the rated capacity load plus the load block weight divided by the number of parts of rope will not exceed 20 percent of certified breaking strength of rope. Hoisting

ropes shall be secured to the hoist drum so that no less than two wraps of rope remain at each anchorage of hoist drum at extreme low position.

2.12.3 Sheaves

Drive sheave shall be steel or semi-steel finished with grooves to receive hoist ropes and shall give maximum traction and minimum wear. Grooved nonmetallic inserts on drive sheave may be provided at Contractor's option.

Deflector and overhead sheaves, suitable sheet metal guards with required service openings, sheave beams and supports shall be provided as required.

2.12.4 Hoist Motor (Geared)

Motor shall be a geared type, direct-current for variable voltage with Class B insulation, designed for elevator service to develop the required high-starting torque with low-starting current in accordance with NEMA MG 1.

Motor shall be designed to meet requirements of elevator service and be capable of starting cold and carrying the full-rated load in car for a period of 1 hour of continuous UP and DOWN runs, stopping at all floors and standing not more than 10 seconds at each floor without overheating. Speed regulation of the car, with full-rated load shall not exceed plus or minus 5 percent of average on a round trip.

2.12.5 Armature

Armature shall be electrically balanced and the armature and brake drum shall be mechanically balanced as a unit. Field coils shall be spool or form wound. Windings in both armature and field shall permit easy removal.

2.12.6 Commutator

Commutator and brushes shall be of sufficient size, area and designed to perform under full-load with sparks barely visible and without overheating.

Brushes shall have individual tension adjustment with provisions for adjusting and positively locking the brush holder in place as a unit.

2.12.7 Brake Assembly

Brake shall be spring-applied, electrically released and designed for automatic application in the event of interruption of power supply. Brake drum shall have a wearing surface and edge of flange turned smooth and wearing surface shall run within a maximum variation of 0.005 inches. Brake shoes shall be lined with a fireproof friction material shaped to shoes so that the drum will run free with normal clearance. Brake springs shall be helical and operated in compression and shall apply the brake when released by the magnet. Brake magnet shall be designed to release quickly.

The brake application shall be automatically controlled by magnetic retardation to obtain noiseless, smooth and gradual stops under all loading conditions. Release magnet coil circuit shall be opened by the various safety devices, power failure, failure of equipment to function in the proper manner for safe operation of car and upon normal stopping of the car.

2.12.8 Bed Plate

Bed plate shall be cast iron or steel in one piece with stiffening ribs to accurately maintain alignment of parts or be heavy rigid structural steel shapes securely welded together. Pads accurately planed or milled shall be provided as seats for parts secured to bed plate.

2.13 SOUND AND VIBRATION ISOLATION

Sound and vibration isolating foundation shall effectively prevent the transmission of machine vibration and sound to building structure. Location and deflection characteristics of isolation units shall produce a uniform and nonexcessive loading on units under all operating conditions.

2.14 VARIABLE VOLTAGE CONTROL

2.14.1 Performance

Control system shall govern the starting, stopping and direction of travel of elevator and provide the operation specified. Control shall be accomplished by an individual generator or solid-state motor control for each elevator where the voltage applied to hoist motor is variable. Control equipment shall be of type suitable for motors and type of operation specified to provide smooth acceleration from stop to full speed, deceleration and landing stops under any load condition from no load to full-rated load. Maximum time from start of car motion to floor level at the next floor for geared machines shall be 6 seconds for a speed of 350 feet per minute. Time from door close to start of car motion shall not exceed 0.7 second with a balanced load. Cycle time, which is the time from start of door close to door fully open at the next floor (based on 14'-0" floor-to-floor height), shall not exceed 11 seconds. Prior to the termination of maintenance period included in the Base Contract, elevators shall be readjusted as required to meet performance requirements. All performance times specified in this section are based on 15 feet 0 inches floor height, and 3 feet 8 inches wide center-opening doors.

2.14.2 Controller

Electric controller shall be microprocessor-based logic type with battery backup system with charger and charge time for a depleted battery, battery reserve and a low-voltage disconnect. Components required for proper performance of elevator shall be neatly mounted and wired and completely enclosed in a cabinet with a mechanically-latched door.

2.14.3 Motor Generator Set

Elevator control shall be effected by means of a uniformly varying dc voltage applied to elevator motor. An individual motor generator set shall be provided for each elevator.

2.14.3.1 Vibration Isolators

Generator set shall be located in elevator machine room and provided with a vibration-isolated foundation or a vibration-absorbing device which shall be effective in preventing the transmission of vibration to building structure.

2.14.3.2 Mounting

Motor generator shall be compact in design with all units mounted on same rigid cast iron or structural steel bed plate. Motor and generator units shall be mounted on a single rigid steel shaft.

2.14.3.3 Start Sequence

Motor generator set shall start automatically by registration of a car or

landing call and shall stop automatically in a predetermined time adjustable from 1 to 12 minutes after all calls have been answered.

2.14.3.4 Duty Rating

Design of apparatus shall be in accordance with the NEMA MG 1 specifications for 50 degrees C temperature rise, continuous-duty rating and IEEE Std 304 rules for Class A insulation and 50 degrees C continuous operation.

2.14.3.5 AC Contacts

Main ac contacts on starting panel shall be copper to carbon. Contacts breaking the main ac line current shall be provided with magnetic blow-outs.

2.14.3.6 Commutator

Sparks from the commutator shall be barely visible when elevator is accelerating or retarding from full-speed with a load in car ranging from no-load to full-load.

2.14.3.7 No-Load Speed

The no-load synchronous speed of motor generator set shall not exceed 1800 rpm. Proper direction of rotation shall be indicated by an arrow on frame.

2.14.3.8 Bearing Lubrication

Bearings shall be anti-friction bearing metal type with oil reservoirs, automatic self-lubrication and gauges, or of the ball-bearing type arranged for grease lubrication and fitted with grease connections.

2.14.3.9 Automatic Remote Control Starting Panel

Automatic remote control starting panel shall contain the necessary switches and overload devices. Starter may be separate or be incorporated in controller.

2.15 SENSOR AND CONTROL WIRING SURGE PROTECTION

Digital and analog inputs shall be protected against surges induced on control and sensor wiring. Digital and analog outputs shall be protected, as shown against surges induced on control and sensor wiring installed outdoors. Fuses shall not be used for surge protection. The inputs and outputs shall be tested in both normal mode and common mode using the following two waveforms:

- a. A 10 microsecond rise time by 1000 microsecond pulse width waveform with a peak voltage of 1500 volts and a peak current of 60 amperes.
- b. An eight microsecond rise time by 20 microsecond pulse width waveform with a peak voltage of 1000 volts and a peak current of 500 amperes.

2.16 COMMUNICATIONS LINKS SURGE PROTECTION

Communications equipment shall be protected against surges induced on any communications link. Cables and conductors, except fiber optics, which

serve as communications links from motor control room (MCR) to field equipment, and between field equipments shall have surge protection circuits installed at each end. Protection shall be furnished at equipment and additional triple electrode gas surge protectors rated for the application on each wireline circuit shall be installed within 3 feet of the building cable entrance. Fuses shall not be used for surge protection.

The inputs and outputs shall be tested in both normal mode and common mode using the following two waveforms:

- a. A 10 microsecond rise time by 1000 microsecond pulse width waveform with a peak voltage of 1500 volts and a peak current of 60 amperes.
- b. An eight microsecond rise time by 20 microsecond pulse width waveform with a peak voltage of 1000 volts and a peak current of 500 amperes.

2.17 COMMUNICATIONS LINKS OVER VOLTAGE PROTECTION

Communications equipment such as MODEMs, line drivers, and repeaters shall be protected against overvoltage on communications link conductors. Cables and conductors, which serve as communications links, except fiber optics, shall have overvoltage protection for voltages up to 480 Vac rms, 60 Hz installed. Instrument fuses or fusible resistors are required for this application.

2.18 LEVELING DEVICES

Elevators shall be equipped with a 2-way leveling device to automatically bring the car to the floor landings. Car shall automatically releve at each landing to correct overtravel and undertravel, and maintain the level regardless of load on the car, rope slippage or stretch of cables.

Electric stopping system shall be arranged so the car will stop level with the floor before brake is set. Stopping accuracy shall not exceed plus or minus 1/4 inch.

2.19 BUFFERS

Buffers shall be of design suitable for depth of pit. Buffer anchorage at pit floors shall be provided for the car and counterweight and arranged to avoid puncturing of the pit waterproofing. Type of buffer used shall be tested and approved for compliance with elevator service requirements. Pipe struts and steadiers shall be provided as required by pit conditions. A metal plate with information concerning stroke and load-rating shall be permanently fastened to each buffer. Pit-mounted buffers shall have an adequate stroke designed to bring the fully-loaded car and counterweight to rest from governor tripping speed at an average rate of retardation not exceeding gravity. Moving portion of buffer shall be designed to be accelerated by the car without a noticeable peak retardation. Spring buffers shall be in accordance with ASME A17.1.

2.20 LUBRICATION POINTS

Every part subject to movement friction shall be complete with provisions for oil and grease lubrication.

2.21 SEISMIC REQUIREMENTS

Seismic protection shall be provided in conformance with TI 809-04 for

general guidance and computation of forces (1.0 G horizontal and 1.0 G vertical minimum), ASME A17.1, Rule XXIV, and ICBO Building Code. The contractor shall hire a registered engineer to submit the stamped calculations and drawings.

PART 3 EXECUTION

3.1 INSTALLATION

Elevators and equipment shall be installed in accordance with ASME A17.1 and manufacturer's recommendation. Guide rails shall be set plumb and parallel and attached to guide rail brackets secured to building framing as indicated and at intervals not exceeding 48 inches. Steel plate shims shall not be used for aligning equipment. Guide rail sections shall be joined rail sections, joined together in accordance with ASME A17.1. Guide rails shall be thoroughly cleaned and made smooth before elevator is put into operation. During installation stainless steel surfaces shall be protected.

3.2 FIELD WELDING

When structural or load-bearing members are to be field-welded, welding and qualification of welders shall be as specified in Section 05120A STRUCTURAL STEEL.

3.3 ELEVATOR WIRING

Wiring shall be provided for electrically-operated items of elevator equipment to comply with requirements of NFPA 70 and Section 16415 ELECTRICAL WORK, INTERIOR. For control and signal circuits wire shall be minimum No. 18 AWG. For power and lighting circuits wire shall be minimum No. 12 AWG. A work light fixture equipped with 150 watt incandescent lamps and ground duplex receptacles shall be provided at both the top and bottom of the car. Work light fixtures and traveling cable junction boxes shall be located to provide illumination at junction boxes. Wiring shall terminate in junction boxes. Wires shall be identified and match symbols shown on wiring diagrams. Control and signal wires shall be brought to accessible numbered terminal blocks on controller. Intra-panel wiring shall be flame-resisting type.

3.3.1 Traveling Cables

Cables shall terminate at numbered terminal blocks in car and machine room. Traveling cable shall be provided with a separate shielded circuit for communication system and hang to obtain proper size of loop. Traveling cable shall be provided with 10 percent spare conductors for each car.

3.4 PAINTING

Except for factory finished items and corrosion-resistant items, machined surfaces shall be painted as specified in Section 09900, PAINTING, GENERAL.

3.5 TESTING

Testing shall be in accordance with requirements of ASME A17.1 and ASME A17.2.1 and as specified below. Contractor shall conduct a complete test of the system. After the system has passed all tests, the Contractor shall notify the Contracting Officer in writing, 7 days prior to the time of performing the acceptance test, that the system is complete and is ready

for final acceptance testing. The Contractor after receiving written approval from the Contracting Officer will conduct a complete acceptance test of the system. Acceptance testing will be witnessed by a certified government elevator inspector.

3.5.1 Testing Period

Each elevator shall be tested with the specified rated-load in car continuously for a period of 35 percent of the duty time. During the test run the car shall be stopped at all floors in both directions of travel for a standing period of 10 seconds per floor. A manual test of the final limits (UP and DOWN overtravel) shall also be performed.

3.5.2 Speed Load Testing

The actual speed of elevator car in both directions of travel shall be determined with the rated-load and with no-load in the elevator car. Actual measured speed of car with the rated-load in the UP direction shall be within 5 percent of rated speed. The maximum difference in actual measured speeds obtained under the various conditions outlined shall not exceed 10 percent of the total difference between the UP and DOWN speeds.

3.5.3 Car Leveling Testing

Elevator cars leveling devices shall be tested for accuracy of landing at all floors with no-load in car, with symmetrical load in car and with the rated-load in car in both directions of travel.

3.5.4 Brake Testing

Brake test shall be conducted with the rated-load in the car. Brakes shall stop and hold the car with the rated-load. In elevators using a Ward-Leonard type generator drive system it is critical to test the suicide circuit to assure that loop currents cannot cause the hoist motor to pull through the brakes.

3.5.5 Temperature Rise Testing

Temperature rise of hoistway motor, motor drive, exciter and booster shall be conducted during the full-load test run for minimum one hour. Under these conditions the temperature rise of equipment shall not exceed the requirements established in NEMA MG 1 Chapter 12. Temperature rise testing shall be started when all parts of equipment are within the temperature required by NEMA at the time of starting the tests.

3.5.6 Insulation-Resistance Testing

Insulation-resistance testing shall be performed to ensure that the complete elevator wiring systems will be free from short circuits and grounds. Electrical conductors shall have an insulation-resistance of not less than one megohm between each conductor and ground, and not less than one megohm between each conductor and all other conductors. Prior to testing, provisions shall be made to prevent damage to electronic devices.

3.6 FRAMED INSTRUCTIONS

Two sets of instructions shall be typed and framed under glass or in laminated plastic, and posted side-by-side in the elevator room where directed, before acceptance of elevator systems. First set of instructions

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shall include wiring and control diagrams showing the complete layout of elevator system. Second set of instruction shall include the condensed operating instructions explaining preventive maintenance procedures, the methods for checking the elevator system for normal safe operation, and the procedures for safely starting and stopping the elevator system.

3.7 OPERATOR TRAINING

Contractor shall conduct a formal training course for DCPS personnel which shall include care, lubrication, adjustment and maintenance of the elevator equipment. Training period of the elevator equipment. Training period shall consist of a total of 8 hours of normal working time and shall start after the system is functionally completed but prior to final acceptance tests. Field instructions shall cover all of the items contained in the operating and maintenance instructions, including demonstrations of routine maintenance operations. The Contracting Officer shall be notified at least 14 days prior to date of starting the training course.

-- End of Section --